REPORT

OF THE

DEPARTMENT OF MINES

NOVA SCOTIA,

FOR THE YEAR 1883.

HALIFAX, N. S.:
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
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REPORT

FOR THE YEAR 1883.

To His Honor MATTHEW H. RICHEY, Esq., *Lieutenant-Governor of the Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR:

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines during the year 1883.

ALBERT GAYTON,
Commissioner of Public Works and Mines.

HALIFAX, February 20th, 1884.

REPORT

ON THE

MINES OF NOVA SCOTIA,

By EDWIN GILPIN, Jr., A.M., F.G.S., F.R.S.C.

INSPECTOR OF MINES.

(Member of the North of England Institute of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,
Halifax, February 20, 1884.

THE HONORABLE
ALBERT GAYTON, M. P. P., M. E. C.,
Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report on the mines of the Province worked during the year 1883.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1883, compared with that of the previous year:

		1882.	1883.
Gold	Ounces	14,107	15,446
Iron Ore	Tons.	42,135	52,410
Manganese Ore	"	205	150
Copper Ore	"		60
*Coal Raised	"	1,365,811	1,422,553
†Gypsum	"	133,426	144,668
†Building Stone	"	4,357	181
Coke Made	"	26,731	44,189
†Grindstones, etc	"	2,450	155
Limestone	"	16,584	26,477

* Ton of 2240 lbs.
† Quantities shipped. Returns not completed. Amounts used in Nova Scotia unknown.

Through the kindness of the Collectors of Customs at the various ports of the Province I am enabled to give further details under this head at the end of the report.

In addition to a detailed notice of the operations of each mine and the usual statistical tables, I submit a summary of the amount of minerals exported, not paying royalty to your honourable Government.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., who is Deputy Inspector of Mines for the district of Cumberland, Colchester and Pictou Counties, and of Patrick Neville, Esq., Deputy Inspector for the Island of Cape Breton.

These gentlemen were appointed on the 10th of May, and at once entered on their work. Since that date they have regularly visited the mines in their respective districts, and examined into all complaints, causes of accidents, etc. I have much pleasure in saying that they have discharged their duties in a highly satisfactory manner, and I believe that their visits are already causing a more careful compliance with the Mines Regulation Act, and greater attention to that important matter—ventilation.

COAL TRADE.

The total sales for the year 1883 amounted to 1,297,523 tons, against 1,250,179 tons in 1882, being an increase of 47,344 tons.

The following are the most noticeable points in the coal trade:

The home sales were 471,327 tons, compared with 458,952 tons during the preceding year.

The coal sent to the Province of Quebec amounted to 410,605 tons, against 383,031 tons in 1882, an increase of 27,574 tons.

The sales to New Brunswick show an increase of 14,123 tons.

The sales to Newfoundland decreased from 79,752 tons in 1882, to 61,678 tons during the past year.

The sales to Prince Edward Island show a decrease of 2,000 tons.

The sales to the United States were 102,755 tons, being an increase of 3,453 tons over the sales of the previous year.

The amount of coal sent to the West Indies increased from 22,386 tons in the year 1882 to 31,860 tons during the year 1883.

The sales to other points present no features of interest.

CUMBERLAND COUNTY.

The total sales of this County amounted to 222,347 tons, against 218,349 tons in 1882. The coal trade of this County presents no new features this year. The exports to Quebec were 46,483 tons, compared with 58,561 tons during the previous year. The sales to New Brunswick were 127,751 tons, compared with 113,435 tons in 1882. The sales in Nova Scotia were 43,731 tons, being 1,781 tons less than during the previous year.

The proposed extension of the coal shipping facilities at Parrsborough will, when completed allow of a considerable export trade to the United States. The position of Parrsborough to the Atlantic towns of the United States is favourable to such a trade, and the length of the shipping season will facilitate the execution of contracts. It is proposed to build a branch railway from Maccan, on the Intercolonial Railway, to the Joggins Mines, on a route following closely the northern outcrop of the seams of the coal field. This branch would accommodate several large settlements, and furnish a winter outlet for coal from the Joggins, Hebert, and other mines.

COLLIERIES.

Boston Coal Mining Company.—In September Mr. Matthew Dunlop opened on the middle seam on the south side of the brook, about 50 feet above the seam formerly worked. The coal is about 2 feet 3 inches thick, and is said to be a good smith's coal.

CHIGNECTO.—During the year 1883 the levels were extended to a distance of 15 chains east and west of the slope. The balances next the slope are nearly worked out. The next ones are now in operation. The strip of coal beyond the second west balance is won by bords driven straight up from the level. In the bords the system of first working the lower coal, about 5 feet high, and then bringing back the top coal, has been adopted to save sending the stone to the surface. An engine is being put up in the west level to drive an exploring slope further to the dip. The records of the Scotia Mine are imperfect, but precautions are being taken to leave a good barrier of coal between the two mines. The output of the colliery was 23,395 tons, against 12,504 tons in 1882.

JOGGINS.—At this mine the workings in the old slope were continued until the end of the year, and in the future operations will be confined to the new slope. This slope has been driven down 1,300 feet, and the levels turned east and west for two balances on each side, which are ready for next year's shipments. The slope is one mile and two chains from the wharf. The waggons are sent down and back by an endless rope working over a Fowler clip pulley, driven by a small engine. The other arrangements at bank are of a permanent and convenient character, suitable for a much larger output than any yet recorded from this colliery. The output was 26,098 tons, against 20,178 tons in 1882.

MILNER.—During the summer Mr. M. Dunlop extended the level at this colliery, and sold 108 tons of coal.

MINUDIE.—At this colliery the slope has been sunk 325 feet, and the levels extended about 300 feet east and west. The coal is extracted on a long wall system, bords being driven to the rise and the pillars extended. The roads are protected by pack walls, until they become inconveniently long, when the lead is shortened by a new horse road.

The seam presents the following section :—

	ft.	in.
Top Coal	1	7
Fireclay	0	8
Bottom Coal	1	9
Total	4	0

At bank a screen has been erected, vertical hoisting engine, engine house, etc., and ten miner's houses. Steam is supplied to the winding engine and pump by two doubled flued boilers, each 15 feet by 3 feet. The tramway to the wharf on the River Hebert is one mile long, the waggons being moved by horses. The total outlay is returned at $13,562.09. The produce was 4,451 tons.

SPRING HILL.—The operations at this mine, as referred to in my last report, have been continued vigorously and successfully. The slope on the north seam is fully equipped, and working satisfactorily.

The west slope bank head is being completely remodelled to form the main hoisting and pumping slope.

A mechanical ventilator, on a principle new to this Province, was built during the summer. The fan is 14 feet in diameter, with blades 6 feet long, and three feet six inches wide. It is driven by a belt from a special engine, and arranged to blow the air down instead of exhausting it as in the Guibal fan, the only mechanical ventilator yet used here.

The fan running at 60 revolutions gave 39,000 cubic feet of air: and 52,000 cubic feet at 79 revolutions. The cost per day of 24 hours, including interest and depreciation, may be estimated at $4.50.

A slope has been driven on a seam of coal of good quality in the area, recently acquired, I understand, by this Company, from the Spring Hill and Parrsborough Railway Company.

The coal presents the following section:

	ft.	in.
Coal	2	0
Shale Parting	0	2
Coal	7	0
Shale Parting	0	4
Coal	1	0
Total	10	6

During the past season 193,161 tons of coal were raised.

Scotia.—A little work was done at this mine during the past year, and 589 tons of coal raised. The coal of this seam, when mixed with roof stone and moistened, ignites spontaneously. The workings on the brook ignited several years ago, and a similar result of neglect of the laws of nature is now taking place in the western extension of the mine. As there is on this area merely a strip of crop coal in this seam, it is regrettable that a lease was ever granted. The barrier already alluded to as necessarily provided between the Scotia and Chignecto workings contains more coal, which can never be removed, than this mine will in all probability ever produce. As the workings are extended along this crop coal they form a reservoir for water, and must prove a menance to future workings in lower sections of this seam.

Prospecting work was performed by Chas. Annand, Esq., on the area lying south of Spring Hill, and formerly known as the Sharp area, and a seam of excellent quality proved to dip to the south at an angle of 17°, and to present the following section:

	ft.	in.
Top Coal	1	0
Shaley Coal	1	0
Bottom Coal	3	10
Total	5	10

His explorations between this point and Spring Hill Village also proved a seam of coal 5 feet thick. This extension of the coal beds will allow of an increased development of the district, as they are conveniently situated with reference to both the Intercolonial and Parrsborough Railways.

A little prospecting was done north of the Scotia and Chignecto mines, and on the west side of the Maccan River, north of the bridge; but I am not aware of any results of importance.

PICTOU COUNTY.

The total sales last year were 461,809, against 446,137 tons during the year 1882. The home sales were 260,980 tons, an increase of 16,935 tons over those of 1882. The sales to Quebec were 145,527 tons, against 125,521 tons in the year 1882. The sales to New Brunswick remained about the same, as was also the case with regard to the trade with Newfoundland. The sales to Prince Edward Island (more than half of which are of slack coal) fell from 41,463 tons in 1882 to 38,622 tons during the past year. Similarly the sales to the United States fell from 24,970 in 1882 to 4,830 tons last year. The sales to other points are unimportant. The manufacture of coke for the blast furnaces at Londonderry was on a larger scale than before, as both furnaces were in blast.

Acadia.—During the past year the system of bord work and pillar drawing adopted at this colliery has been regularly carried on. A battery of four Babcock boilers has been put up, and found to result in an economy of fuel and steam. Expensive, and sometimes fatal, accidents are caused by links of ropes, couplings, etc., breaking on the slopes, gangways, etc., of our mines. At this colliery all links are tested periodically to double the maximum strain they may be expected to sustain in the pit. This method of testing, although not necessarily a conclusive guide to the safety of the link at any given moment, provides, at a trifling cost, so satisfactory a protection to the interests of the company and the workmen, that it should be adopted at all our collieries. Mr. Poole has introduced the Howe rocker grate under his boilers, with highly satisfactory results. A description of this rocker will be found further on in my report. The output of the colliery was 115,028 tons, against 105,569 tons in 1882.

Albion Mines.—The regular operations in the Third seam have been continued during the year, and the slopes extended. At the McGregor pit the north slants have been extended to give a good winning. A new engine is being erected to haul from the south slants. A set of rollers has been put up to crush round coal for the coke ovens. The set of ovens at the McGregor are now working, and the total production of coke has been 25,536 tons, against 12,512 tons in 1882. The total amount of coal raised was 168,231 tons, against 141,090 tons in the year 1882.

A special report was made to you relative to the cause, extent and effect of the fire, which has existed for over thirteen years in the workings of the abandoned mines at this Colliery. I now give the following memo. on the subject The Foster pit was sunk in the year 1866 to the main seam, near the face of the western workings of the Dalhousie pits, in the same seam. In May, 1870, a fire, of unknown origin, started in a stopping or wall between the workings of the new pit and of the Dalhousie pit. It being found impossible to put the fire out, the shaft and all openings likely to admit air were carefully closed. Owing to the great extent of coal worked near the crop of the main seam, complete exclusion of air was not attainable. The fire kept gradually eating its way toward the crop; and in the year 1872 its smoke was found in the workings of the underlying or deep seam, at a point where the removal of pillars had allowed the roof to break away up to the overlying seam, and necessitated building off part of the pit. The attempts hitherto made to exclude air from the fire were not allowed to relax, and all subsidences along the outcrops were carefully closed. The workings in the portion of the Dalhousie workings to the westward of the pit and next to the Foster pit, were carried about 35 feet high, the total thickness of the seam, and the pillars left merely large enough to secure the safety of the miners engaged in working. As the pillars and roof became weakened, a considerable district, next to the Foster pit, fell in and was crushed. This crushed district retarded the progress of the fire toward and along the crop of the main seam. About four years ago a portion of the Dalhousie workings, immediately east of this crushed district, fell so as to admit large volumes of air. Before the hole could be closed the presence of fire was discernable close to it. About two years ago a hole still further east also showed signs of heat before it was closed. In January of last year the weakening of the small pillars, already referred to, and of the shaley roof, became so general, that holes fell in at several points still further east. Owing to the difficulty of gathering earth, etc., in the depth of winter, to fill them with, the large volumes of air, unavoidably admitted, caused a rapid extension of the fire until flames issued at several points. After much trouble and expense these openings were finally closed, and at present the fire in these crop-workings is not increasing. As the ground at this part of the outcrop of the main seam is from 75 to 150 feet above the level of the East River, it will be seen that no successful attempt could be made to flood the coal immediately along the outcrop. I may add that the coal which has been burning would never have been mined, as it would not pay under any conditions of trade to re-enter these old workings with the small pillars and broken roof, as the danger and cost of mining would be very great. The fire under consideration, has no connection with any of the numerous fires which have occured at these mines since the date of their first opening, and which have been referred to in various reports.

Intercolonial.—The operations of the past season present few new features of interest. The No. 4 slope was worked until the fall. The levels in the main slopes were extended, and a regular extraction of coal maintained. In the new pit, connection has been made

with the air shaft, and inclines are being driven to the dip from the pit bottom. The bankhead screens, etc. have been completed. The No. 1 and 2 slopes were re-timbered and laid with new rails. The output of coal was 147,711 tons, against 150,486 tons raised in 1882. The returns show an expenditure of $16,057, principally in machinery and colliery buildings.

VALE.—During the past year the extraction of pillars in the No. 3 lift has been satisfactorily completed. The No. 4 lift has also been extended for four balances on each side, and the pillar work commenced. The new winding engines are running satisfactorily. They are a pair of very handsome and substantial horizontal direct-acting engines, 30 inch cylinders, with five feet stroke, and a drum fourteen feet in diameter. Steam is supplied from four steel boilers, thirty feet long by five feet six inches in diameter, with two twenty-inch flues. The refuse coal, or "culm," is used for steam raising.

The "six foot," or Greener seam, is being opened by a slope which is now down about 350 feet. The dip of the seam at the crop is 28°, but it appears to flatten as it goes to the dip. It presents the following section:

	feet.	inch.
Coal	2	5
Slatey Band	0	1
Coal	0	7
Slatey Band	0	2
Coal	2	0
	5	10

The output of the colliery was 74,656 tons, against 92,808 tons in the previous year.

CAPE BRETON COUNTY.

The sales of coal from this County amounted to 612,614 tons, against 585,568 tons in the year 1882.

The home sales were 166,262 tons as compared with 169,327 tons during the previous year.

The sales to the Province of Quebec were 218,595, against 198,892, tons during the year 1882.

The sales to New Brunswick and Prince Edward Island remain at nearly the same figures as in the previous year.

There were 58,342 tons sent to Newfoundland, a decrease of 20,245 tons as compared with the export of the year 1882.

The exports to the West Indies were 30,781 tons, an increase of 8,400 tons over the amount sent during the preceding year.

The United States took 93,443 tons, of which 53,570 were slack coal, an increase of 20,000 tons over the amount sent the year before.

The sales to other points were inconsiderable.

COLLIERIES.

SYDNEY.—There are no new features connected with the underground workings which call for special reference. The face of the south side levels are now 85 chains from the pit bottom. The south side dip slants have been extended and the faces of the dip workings correspondingly advanced The output was 162,866 tons against 156,758 tons in 1882. There were 110 tons of coke made.

VICTORIA.—The work of equipping and winning out this mine has been steadily continued. The centre slope has been driven 350 feet on a course due north, and at an angle of 24°. The east slope has been driven 237 feet on a course North 42½° East, at an angle of 17½°. The west slope has been driven over four hundred feet at a similar dip, and on a course North 42½° West. Necessary machinery and buildings are being erected, and the railway to the pier is completed. The returns show an expenditure of $24,736.00.

LINGAN.—Operations have not been on a large scale at this colliery. The water which was allowed to accumulate in the sea area workings after the accident of 1873, was all taken out during the summer, and the levels, etc., put in order for resuming work. The output was 16,482 tons.

RESERVE.—This was an unusually brisk year at the Reserve Mines. Their sales were 110,456 tons, against 93,828 tons in the year 1882, and 76,727 tons in 1881. The work of the previous year was extended. A boiler and pump were placed in the main slope to save the necessity of carrying the steam over 2,000 feet. The extended scale of working necessitated attention to the ventilation, as will be seen by reference to Mr. Neville's report. During the year 1883 the company shipped 16,548 tons at Louisburg.

INTERNATIONAL.—At this mine the system of working hitherto in force has been regularly continued. The pit bottom has been lowered, and a road graded at a fall of ⅜ of an inch to the yard to a point 35 chains from the pit. From this point a dip road has been driven to take the coal from the south-going bords. The old engine plane is utilized for drawing the north side coal. This division of the work will allow of an increase of the output, and minimise any delay from break downs below ground. A new pump has been set to pump from the dip face to the water level. The pit has been roofed in. About 60 tons of steel rails have been laid on the railway. The output was 99,018 tons, against 109,286 tons in the previous year.

LITTLE GLACE BAY.—Work has been regularly continued here during the past year. The wharf was strengthened, and the channel dredged. It is reported that preparations will be made to ship the coal from the Caledonia Mines at this harbor. A concentration of

the various shipping piers in this coal field is highly desirable, in view of the heavy and continued expenses caused by ice, worms, and shifting sand to the various artificial shipping places now maintained by the different companies. The output of the mine was 75,848 tons, against 70,186 tons in the year 1882.

Caledonia.—The extraction of pillars has been regularly continued, and an incline road 800 feet long, with clip pulley, driven, to deliver the rise coal from the west side at the pit bottom. The railway to Glace Bay harbour is in course of construction; it is reported with a view to shipping coal at that point. The output was 51,500 tons, against 59,893 tons during the preceding year.

Ontario.—During the past year there were few new features at this Colliery. A steady business was done during the summer, and the output was 22,038 tons, against 25,541 tons in the year 1882.

Block House.—The extraction of pillars was continued during the summer, and the dips have been emptied of water. It is intended that during the winter as much coal as possible will be taken from some large blocks left in the centre of the basin.

A shaft has been set away to the west of the Long Beach road, to win the McAulay seam. It was sunk about 250 feet, when work was stopped until a new 50 horse-power sinking engine was put up. The sinking, which is not very wet, will be facilitated by the use of a Dean sinking pump. The output of this mine was 55,300 tons, against 61,753 tons in 1882, and an expenditure of $7,100.00 returned.

Gowrie.—Operations have been entirely confined to the new shaft winning. The levels have been extended to the north, and bords opened on the system in force at this colliery. The seam shows from 5 feet to 5 feet 6 inches of coal at the face. An incline has been made to run the rise coal to the pit bottom. The small tubs are being replaced by larger ones, holding about a ton of coal. The trials made of the Hadfield steel wheels under the tubs, has proved entirely satisfactory. They are lighter and more readily lubricated than the iron ones in ordinary use in the Province, and their durability is reported to be much greater. 73,290 tons were raised against 62,256 tons in the year 1882.

MISCELLANEOUS.

The Chimney Corner Mine was re-opened by Mr. Evans, and worked during part of the summer. A level was started on the beach, seven feet above high water mark, and driven in across the old slope for a distance of about 300 feet, and bords turned up to the rise. Repairs were made to the breakwater to allow of shipments being made.

Explorations were carried on at the Sydney Colliery, Little Pond, and a return made of an expenditure of $2370.73.

Exploratory work was carried on in the vicinity of North Sydney by Messrs. Ingraham, Gannon and others. They report finding a seam of

good coal, four feet thick, outcropping 10 chains west of the Sydney Mines, No. 3 seam, on which they drove a short prospecting slope. They report another workable seam five feet thick, known as the Tully seam, lying 11 chains west of the last named seam.

In the Onslow district of Colchester County the explorations, referred to in my last report, have been continued on the DeBert and Chiganoise Rivers. The presence of several seams has been proved, and a seam on the DeBert River, about five feet thick, is being tested by a slope which is now down about 150 feet. The coal appears to be of excellent quality. Fuller information about this locality was given in a paper recently read by me before the Nova Scotia Institute of Natural Science.

Explorations were made for coal at New Germany, in Lunenburg County, but being in pre-carboniferous strata, the results were not encouraging. Discoveries of coal were reported from Fenwick, in Cumberland County, but no work was done to test its extent.

REPORT OF W. MADDEN, ESQ., DEPUTY INSPECTOR OF MINES.

WESTVILLE, PICTOU CO., Dec. 31, 1883.

The Hon. the Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report, on my work, as Deputy Inspector of Mines, in the district of Pictou, Colchester and Cumberland.

VALE COLLIERY.—I visited this Colliery May 26, June 18, July 17, October 12, November 19, December 19. On each visit I travelled the working faces and airways, and found the ventilation good, a tabulated statement of which please find at the end of my report. During the past season a set of strong boxes were built for the conveyance of men up and down the slopes, and a new travelling road made to the outcrop between the fan and the slope. The tenderness of the roof at various points through the mine has necessitated special attention to timbering and a general careful supervision of the workings. The work of opening out a new mine on the six foot seam has been commenced.

ALBION MINES.—These works were inspected by me May 30, June 25, July 31, August 31, October 1, November 14, December 22. On my visits I found the air good, and the operations carried on in compliance with the law in the MeGregor and Third Seam workings. During the past season a travelling road has been made from the outcrop to the MacGregor seam workings. Several accidents occurred at these mines, which, I presume, have been reported to you, and you are in possession of the results of my examinations into their causes

INTERCOLONIAL COLLIERY.—I visited these mines May 28, June 21, August 2, August 29, October 14, November 12, and December 28. The Intercolonial Company operated during the summer three slopes and a pit on the second seam, and toward the close of the season discontinued their work in the No. 4 slope and Second seam. During my visits I found the air good. The low levels in No. 2 slope, which are driven ahead to drain the coal, gave off a good deal of gas during part of the summer. In June a delay of a week was caused by the burning of the slope engine-house, which has just been replaced by a brick house with an iron roof. In September the area of the upcast shaft was enlarged and the ventilation thereby improved.

ACADIA COLLIERY.—I visited this mine May 23, June 20, July 30, August 27, October 5, November 19, December 29, and travelled the workings and air courses. The ventilation was good and carefully conducted. During the past season a new lift has been driven, and the operations have been continued in their usual systematic manner.

During the fall Mr. I. McNeil did a little work on the Lawson seam, on the Kirby area, with a view to mining coal.

DEBERT MINE.—I visited this mine on the 8th of December, and found an exploring slope being driven down on a seam of coal four feet three inches thick. The slope is about 150 ft. long, and the management intend putting up machinery to facilitate their operations.

SPRINGHILL MINES.—I visited these mines June 8, July 10, August 8, September 21, October 30, November 20, December 7, and found matters generally satisfactory. There has been a "blow down" fan put up, which has materially helped the ventilation. In the fall a little gas being noticed, a shot firer was appointed for the section of the mine in which the gas was reported. In November the machinery at the new slope was completed. An opening was made by the company on a new area, about one mile west of the present workings. This company have made a large outlay during the past season for machinery, engines, pumps, etc., with a view of still further enlarging their output.

CHIGNECTO MINE.—My visits to this mine were made June 11, July 13, August 10, September 20, October 29, and December 8, and the ventilation, timbering, etc., was found satisfactory. During the summer the ventilation was augmented by a steam jet placed in the upcast. The Bennet level still remains sealed up, and the fire has apparently died out. The fatal accident to D. Lockhart, on October 30th, was investigated by me, and arose from disobedience of orders.

SCOTIA MINE.—This mine was visited several times, and the operations were found to be on the usual small scale. The top coal of this seam has several times heated, and proved a source of trouble, notably last spring at the Bennett level. During the past season it was found necessary to build off a part of the goaf in this mine which had heated

MINUDIE MINE.—I visited this mine June 13, July 14, August 9, September 16, October 28, and found matters satisfactory. They have gradually got the colliery in working order, and their long wall system is fairly under way.

JOGGINS MINE.—I visited this mine June 12, July 9, August 8, September 18, October 28, December 4. On examination of the old slope workings, I found the return airways defective, owing to the fireclay bottom. As the amount of air circulating would suffice with care, and the management did not intend working this slope after the end of the year, and the expense of thoroughly repairing them would be heavy no attempt was made at their permanent restoration. The new slopes have been driven down, levels turned away, and two balances driven. On July 11th, a miner named Charles Burke, sustained injuries from a fall of coal from the face, which resulted fatally. From my investigation it did not appear that any blame was to be attached to the officials.

Mr. Matthew Dunlop leased the Milner mine and worked it until August, when he moved to the Boston Company's area and worked on the south seam during the fall.

The above notes will convey an idea of the visits made by me during the past season. I presume you are in possession of returns of accidents, a tabular statement of which, so far as they have come under my notice, is appended. I also submit, in the form of a table, the amounts of air circulating at the various collieries.

I beg leave, in conclusion, to draw your attention to a point which I consider of importance. During the past season miners have repeatedly stuck their picks into the gauge of their safety lamps. The opening thus made by the pick reduces the safety lamp practically to an open or unprotected light, and might easily lead to a disastrous explosion if it occurred in a place becoming foul from inflammable gas. Several men have been fined for this by the Magistrates, and others have been punished by the Colliery officials, but the accidents still occur. The special rule bearing on the subject requires the safety lamp to be hung out of the reach of the pick as it is swung by the miner. I would suggest its being altered to read that the lamp be hung at least one foot beyond the extreme swing of the pick.

I have the honor to remain, Sir,

Your obedient servant,

W. MADDEN, JR.,

Deputy Inspector of Mines.

TABLE,

SHEWING THE QUANTITY OF AIR IN CUBIC FEET, PER MINUTE, CIRCULATED IN THE CUMBERLAND AND PICTOU COLLERIES, DURING PART OF THE YEAR 1883.

COMPANY.	MINE.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.
Intercolonial Coal Co Drummond Mines. Westville.	Slopes No. 1 and 2	70000	70500	75000	80000	91200	94000	94000
	Slope No. 4.	10500	10500	11500	12500	13320	Idle.	Idle.
	Shaft.	5000	6000	6000	8000	8500	Idle.	Idle.
Halifax Coal Co'y. Stellarton. McGregor.	North Side.	15960	15960	16000	16500	18560	18000	19000
	South Side.	13068	13068	15000	15500	16548	20000	21000
Douglas.	Slope No. 1.	16275	17000	18250	19000	20000	20500	21000
	Slope No. 2.	18576	18000	18250	18500	18864	19250	19500
Acadia Col'ry, Westville	1 Slope.	65280	63000	64000	65000	66000	59000	60000
Vale Colliery	1 Slope.	41000	45000	50000	55000	62800	65000	65500
Spring Hill	3 Slopes.	55280	64000	64300	64750	65800	66100	66200
Chignecto	1 Slope.	16000	18000	18255	18758	19052	19675	21000
Minudie.....	1 do.	5000	7000	7200	7360	7520	7850	.....
Scotia.....	1 do.	3000	3120	3155	3350	3670	3920	4125
Joggins	1 do.	6520	6720	7025	7350	7859	8250	9000

REPORT OF P. NEVILLE, ESQ., DEPUTY INSPECTOR OF MINES.

BRIDGEPORT, C. B., January 15, 1884.

The Hon. the Commissioner of Public Works and Mines:

SIR,—I beg leave to hand you the following report of my work as Deputy Inspector of Mines for Cape Breton.

SYDNEY MINES.—I have visited these mines seven times since my appointment in May last. Agreeably to the advice of the Inspector of Mines I have aimed particularly at acquainting myself with the systems of ventitation adopted at each mine. At this mine the ventilation seems to be well conducted around the face of the workings. The average amount of air entering the mine is 59,000 cubic feet per minute. This is split at the pit bottom, and again subdivided at the several sections of the mine, and all returns to the fan shaft, except a scale of 6,000 feet through the pumping shaft. Mr. Brown, the manager, has had the general and special rules distributed among the men, in order that they may familiarise themselves with its requirements. Three accidents, one fatal, happened at these mines. I enclose a table showing the number, causes, etc., of all accidents in the district.

VICTORIA.—The progress of completing this winning is being steadily carried on. At present the mine is aired by natnral ventilation, but in a short time satisfactory arrangements will be completed for an efficient supply of air. An air shaft is sunk and connections made for placing a Champion ventilator. This will make the second mechanical ventilator in the Island, and I trust that at no distant day they will be found at every mine.

LINGAN.—At this colliery the air is admitted through the main slope and the water level, and after airing the faces is carried to the furnace, the average circulation being about 23,000 cubic feet.

INTERNATIONAL.—The supply of air enters from the drawing shaft, sea adit, and slope, it is split to air the dip and rise workings and returned to the furnace. On my first visit the air was somewhat dull in the south side workings, an extension and repair of the stoppings brought a satisfactory air up to the face of the bords.

RESERVE.—On my second visit I found the air dull at the face of the north side workings. The management made an improvement by enlarging the upcast and by building a cupola over it and by enlarging the airways. There are three inlets. The air going down the east slope ventilates the south side bords, joins the air entering by the French slope, airs the north side of the French slope workings, and returns to furnace. The air going down the north main slope splits, and after airing both sides of the slope, returns through the pump slope to upcast shaft on the north side, circulating about 9,000 cubic feet.

Little Glace Bay.—Sterling pit. I have visited this mine seven times. The ventilation in the colliery is by exhaust steam in the pump shaft; it was improved during the summer by enlarging the intake shaft, and by building a cupola over the upcast. The hoisting shaft has been enclosed up to the bank-head and air-tight doors put on.

Caledonia Mines.—The air at this colliery appears to be regularly managed, it enters from a slope and the adit, and after going round both sides of the pit, returns to the furnace. A complaint was made of the unsafe state of the travelling road. On examining into the matter, the underground manager stated that there was another road by which the men could travel; however, the road in question was retimbered and put in order.

Ontario Mines.—In this pit the air enters the mine by the main slope, is split to air both sides, and by means of an overcast is joined again and carried to the furnace. The air was a little dull at the face of the dip workings, this was remedied by stoppings across the front of the bords on the high side of the level. I was obliged to draw attention to the state of part of the travelling road, and it was repaired.

Block House.—There is considerable difficulty experienced in airing this mine, for the taking out of the pillars under so thin a roof lets in air so as to materially interfere with any regular arrangement of ventilation. I would remark that the coal shipped from this pit, came almost entirely from the pillars, and was drawn without any accident.

Gowrie Mines.—I have visited this mine seven times. In this mine I found the air carefully attended to. It enters near the crop and from thence passes through a well secured air course to the new workings, and after passing the faces returns by the levels to the upcast.

Chimney Corner.—I visited this mine in the fall, and cannot give much information about it, as work had ceased and level was obstructed by debris.

In conclusion I would draw your attention to a practice which I consider very dangerous. I allude to the use of iron needles and tin castors. The custom is for the miner to put the powder into the back of the hole by throwing it in by means of the castor, then to stem 6 to 18 inches of clay or slack after it. When this is done the needle is driven by a maul to the back of the charge. I believe that greater safety would be secured to the miners if the use of copper needles and copper or zinc castors were made compulsory. I would also recommend the extension of special rules throughout the district, and believe that it would be found beneficial to all concerned if more pains were taken to distribute the mining regulations among the men.

I enclose herewith a table of accidents, and a table showing the number of my visits and the average amount of air circulating at each mine. I have the honor to remain

Your obed. servant,

P. Neville,

Deputy Inspector of Mines.

Table showing number of visits paid, and average circulation of air in Cape Breton pits.

Name of Mine.	No. of Visits.	Average amt. of air during working hours.
Sydney Mines	7	59,000 Cubic feet per minute.
Victoria "	4	7,000 " "
Lingan "	8	23,000 " "
International Mine	8	24,000 " "
Reserve Mine	8	26,000 " "
Little Glace Bay Mine	7	23,000 " "
Caledonia Mine	7	25,000 " "
Ontario "	7	17,000 " "
Block House Mine	7	22,000 " "
Gowrie Mine	7	25,000 " "
Chimney Corner	1	

GOLD MINING.

The increase in the yield of gold during the past year, although not as large as during the year before, is still of a satisfactory character. The total yield of gold for the year 1883 was 15,446 oz., 9 dwts., 23 grns., being, with the exception of the year 1877, the largest return since the year 1871, when a production of 19,227 ounces was recorded.

There were 25,954 tons of quartz, etc., crushed, which gave an average yield of 10 dwts. 21 grns. per ton crushed. This is the lowest yield, per ton, since the year 1869. As it is understood that, generally speaking, the year's operations have proved satisfactory from a financial point of view, it would appear that increased attention has been given to economy in mining and milling.

The lowest yield per ton was in the Sherbrooke district, where 8,470 tons yielded 3,356 oz. 18 dwts., an average of 7 dwts. 22 grns. A considerable portion of this was from low grade ores, which ran from 4 to 6 dwts. per ton. The experiments on low grade ores, as carried out at Mount Uniacke and Sherbrooke, show that with plant of the proper extent and with proper business economy in mining management and milling, this grade of material can be treated with satisfactory results.

The richest returns during the past year were made by the districts of Stormont and Chezetcook. The former district is worked by the Gallaghar Gold Mining Company, which extracted 1,917 ozs. from 551 tons of quartz. The Chezetcook district, where the Oxford Gold Mining Company are at present almost the only operators, returned 2,494 ozs. 5 dwts. from 1,475 tons of quartz, an average yield of 1 oz. 13 dwts. and 10 grns.

The returns of unproclaimed and other districts were not as large as usual last year, owing to the proclamation of the district of Darr's Hill (Salmon River) which has hitherto figured under this head.

The total number of days' labor was 97,703. This probably represents fairly the work performed in connection with mining operations, and is a little less than last year.

DISTRICTS.

CARIBOU.—The returns for the past year show a falling off in the amount of gold extracted, from 588 to 477 ounces, but the amount milled was considerably larger, being 2094 tons, against 1601 tons in the year 1882. During the fall Mr. Caffrey re-opened his mine in the Jennings district, but after a short time stopped work. Mr. Touquoy worked for some time on a cross lead, and sunk 32 feet on it.

At Moose River the operations of the Moose River Gold Mining Company were suspended, and the various leads let to tributors, who worked on the North, Comstock, and other lodes. Mr. Touquoy did some work on the Little North Lead, sinking two shafts, to the west of the Moose River Company's area. Mr. Henry Archibald did some prospecting at the west end of the district.

DARR'S HILL.—This locality, commonly known for some time as Salmon River, was made a proclaimed gold district in June last. Hitherto its returns have been published among those of unproclaimed and other districts. The returns show 18,120 days' labour, 7,602 tons of quartz crushed, and 3,885 ounces of gold. The total returns from this mine since it was opened, up to the close of the year 1883 are 9,726 oz. 7 dwts., from 12,574 tons of quartz, a gross return of about $200,000. The main vein worked varies in thickness up to 6 feet. The main shaft is about 100 feet deep and stopes have been carried over 400 feet on each side of it The ore is carried on a tramway about one half a mile to the mill, and about 20 stamps are kept continually running, Mr. Hattie did some work on the west shore of Eagle Lake on a south dipping lode, 2 to 4 inches thick, and prospected other lodes.

FIFTEEN MILE STREAM.—During the past year little was done on the Hall-Anderson property. In the fall Mr. R. G. McDonald extracted quartz from the Orion belt. Mr. Hudson continued testing the eastward extension of the Hall-Anderson lodes with satisfactory results, and on area 29 Block 3 he opened a belt giving three feet 6 inches of crushing material, which gave promising results on crushing.

On lease No. 41 Mr. J. S. Mackay opened the Nonpareil lode, and took out quartz for a trial crush. Prospecting was also carried on by Mr. Grant and others.

GAY'S RIVER.—Mr. Parker did a little work and collected a few dollars worth of gold, but was prevented from doing much by want of a crusher.

MONTAGU.—Work in this district was almost at a standstill during the past year. Messrs. Symonds did a little work on their property, and other parties prospected in the Eastern part of the ground. In the fall a promising lead was opened by the Bluenose Gold Mining Company,

who have built a mill and put up the engine, pump, etc., necessary to thoroughly test it. Mr. Hale has rebuilt the concentrating mill which was burned down fall before last, and after some experimenting with a set of Embrey concentrators, considers the problem of re-working Nova Scotia quartz tailings to be practically solved.

Oldham.—This district presents few new points of interest. Mr. Baker worked his cross vein in the spring, and some work was done on the adjoining Donaldson properties. During the summer tribute work was done on the Fraser property, and on the old Donaldson areas, and west of the Britannia area. The returns show 999 ozs. of gold against 411 ozs. in the year 1882.

Renfrew.—The operations carried on by Dr. Rae were stopped in the spring. Subsequently Mr. A. A. Hayward, manager of the Empress Gold Mining Company, opened on the eastern extension of the Preeper lode. A shaft has been sunk 100 feet, and levels driven to cut two lodes, 12 and 9 inches thick, lying a short distance south. The work has been systematically laid out, and as the main lode averages from 2 to 3 feet, it should yield well when the *pay* of the lode is cut by the new workings. The engine house is well fitted with hoisting gear, etc., and a Blake air compressor, to drive three drills. The Ophir mill has been repaired, and crushing was to begin at the close of the year.

Sherbrooke.—The returns show 8,470 tons of quartz, etc., crushed for a yield of 3,356 ozs., 18 dwts., 17 grns, being an average of 7 dwts., 22 grns., against 6,251 tons, yielding 2,542 ozs., 17 dwts., an average of 8 dwts., 3 grns., during the year 1882. As the returns of this, the most important district in the Province, have, for several years shown a continued decrease, it is gratifying to find indications of a return of prosperity. The principal operations were on the Pactolus, where the belt was extensively worked. On the Rockville two shafts were sunk on some small leads, in about one foot of slate. Mr. Hamilton worked on the Meridian, taking out a belt about 7 feet wide. During the preceding year this property gave 3,300 tons of mill stuff, yielding at the rate of 6 dwts. and 3 grns., and the results were satisfactory, although the work was carried on in a small way.

On the Hayden and Derby a shaft was sunk 200 feet, and stopes carried on a vein from 2 to 4 inches thick. It was found necessary to keep back the water from adjoining workings by means of a dam.

Some work was also done on the Cleverdon property and in the areas lying north of the Hayden and Derby.

At Cochran's Hill, the Halifax and Boston Gold Company put up an engine and pump on the west end of the property, and during the summer they did some work on the same leads near their east line.

Stormont.—In this district scarcely any work has been done, except by the Gallaghar Gold Mining Company. Their returns for the past

year were 7,520 days labour, 551 tons of quartz, and 1,917 ounces of gold, an average of 3 oz. 18 dwts. The total yield of the mine up to the end of the year 1883 was 2,822 ounces, from 1,065 tons of quartz. The operations referred to in my last report have been steadily continued, and present no new features.

At Country Harbor Narrows the Messrs. Mason did some prospecting on a slate belt carrying several leads showing gold.

TANGIER.—The returns for this district last year were 1,140 tons yielding 798 ounces. Mining has been confined principally to Strawberry Hill, where the Brunswick Company were at work. The mill has been completely overhauled, and new mine buildings erected. The principal operations were on the Forrest lode in the vicinity of the Mooseland road.

At Mooseland a few tons of quartz were crushed.

UNIACKE.—This district gave 1,197 ounces from 2,809 tons of quartz, etc., an average of 8 dwts. 12 grns. The chief work was done by Mr. Blois, who worked for some time in a lead near the pond, and afterwards in the slate belt of the Montreal property. Mr. Prince worked in the Uniacke area, and re-opened the nugget lode in its eastern extension.

Mr. Davidson continued his mine by driving north and taking out some quartz rolls, and then driving south where two good leads were found and opened on the top. Mr. Madill worked west of the Davidson area, and Mr. D. Brown did some work on the Prince of Wales area.

WINE HARBOR.—This district gave no returns, Mr. May having transferred his operations to Sherbrooke.

UNPROCLAIMED AND OTHER DISTRICTS.

CHEZZETCOOK.—The Oxford Gold Mining Company have worked steadily during the past season. Their lead varied in thickness up to 15 inches. The paystreak dipped at a heavy angle to the east.

An adjoining lode was opened and found to warrant working. A very good mill of ten stamps has been running during the year. The returns show a yield of 2,494 ozs. from 1,475 tons of quartz. The total returns from this mine since the start to the end of the year 1883 being 3591 oz. from 2086 tons of mill stuff. Preparations are being made to build a mill on an adjoining property known as the Cambridge, where some promising leads have been opened.

At Yarmouth, in the spring, tests were made of the Chegoggin measures, and in the fall it was reported that the lead had been found which was considered to have furnished the surface gold over a considerable tract of country.

A five ton sample from the Lochaber mine gave 2¼ ozs. of gold.

At Bridgewater, Lunenburg county, on Leipsigate Lake, a rich cross lead was found by Mr. Owen, it turned in a slate belt and, at the time of my visit, the slate belt carried three leads from 2 to 4 inches thick, in three feet of slate. A considerable amount of gold has been taken out by hand. Messrs. Hall & Owen found a promising lode on the north side of the lake, which averaged about 20 inches of mill stuff and showed gold over a distance of 600 feet. Were a mill put up I see no reason why this district should not prove a very remunerative one.

Indian Path.—Preparations are being made for resuming work on the large lode, and a little prospecting was done at the Ovens.

COPPER.

During the past summer the Coxheath Copper Mining Company did a great deal of work at their mine near Sydney, Cape Breton. Their levels were extended and a good deal of ore stoped out. A few tons of this were handpicked and sent away for testing. Experiments were made on the low grade ores, and it is stated that preparations are being made for the erection of a large concentration plant in the spring. Some of the copper was found to carry 80 oz. of silver to the ton.

At Margaretville, in Annapolis County, some work was done in the vicinity of the old mine, opened on a vein carrying native copper, etc., in the trap.

Discoveries of copper were reported from Pleasant Valley, Yarmouth Co., Pomquet Forks, Antigonishe Co., and Scottsburn, River John, and Malagash, in Pictou and Colchester Counties.

IRON.

During the year 1883 the operations of the Steel Company of Canada were carried on vigorously, and 52,410 tons of ore taken out, and 7,672 tons of ankerite quarried for a flux.

Some prospecting was done by Mr. Jas. McKay, Battery Hill, Pictou County, on veins of specular ore. The thickest vein opened was said to be 7 feet wide and of good quality. In the Indian Reserve near St. Peters, Cape Breton, Mr. Joseph Matheson reported finding several lodes of specular ore.

LEAD, SILVER, ETC.

Some exploration was made by Mr. J. McLean on a lead ore, carrying silver and gold, found between Cheticamp and Cape Lawrence. A few barrels full of Bismuth glance and Molybdenite were shipped from Gabarus to the United States.

Mr. Howard Clarke continued prospecting on his silver lead property at Smithfield, and has shown that there is a very large amount of available ore.

ANTIMONY.—In my report on the mines and minerals of Nova Scotia, published in the year 1880, I alluded to the probability of the ores of Antimony being discovered in workable quantities in this Province. During the fall a vein of this ore was found near East Rawdon. The ore is reported to be of excellent quality, and to be present in workable amounts. A large sample has been mined and shipped to Swansea.

OIL.—Boreholes were started for the purpose of testing lands near Pictou, where signs of the presence of oil deposits have for some time been noticed.

GYPSUM.—The exports reached 144,668 tons, an increase of 11,242 tons over the production of the preceding year.

MANGANESE

Mr. J. W. Stephens continued working his mine at Tenny Cape, and his brother also did some work at Tenny Cape and at Walton. Some prospecting was done at the latter place by Mr. Stevens and others, and at Onslow by Mr. Pendergast and others.

At Loch Lomond, in Cape Breton, Mr. Moseley continued working his mines. Further information on the Manganese ores of Cape Breton was given in a paper recently read by me before the Nova Scotia Institute of Natural Science.

ACCIDENTS.

During the year 1883 the following fatal accidents occurred:

1. February 17.—Chignecto Mines, John Hudson, W. Patton and I. Burrows—suffocated by carbonic oxide.

2. February 28.—G. Flinn, miner, Vale Colliery—killed by fall of coal.

3. March 9.—D. Bailie, incline boy, Albion Mines—killed by runaway rake.

4. April 13.—J. McKay, incline boy, Intercolonial Colliery—killed by fracture of pinion wheel.

5. May 3.—A. Fraser, Jas. Gillies, W. Hannahan, W. McGilvray, Jas. McEachran, Colin Campbell, John Nicholson, Vale Colliery—killed by breaking of drawbar on trolley on which they were riding in slope.

6. May 23.—John Davison, miner, Stormont—killed by fall from tub in shaft.

7. June 13. H. Rude, miner, Stormont—killed by blast.

8. July 11.—Chas. Burke, miner, Joggins Mines—killed by fall of coal.

9. Sept. 26.— G. Murphy, Tangier—fell down shaft.

10. October 13.—Angus Keigan, driver, Sydney Mines—run over by coal tub.

11. October 30.—Dan. Lockhart, incline boy, Chiegnecto Mines—killed by cage going off track.

12. December 20.—W. Fletcher, incline boy, Spring Hill—killed by fracture of brake bolt.

I would remark, in reference to the above—

(1.) The accident at the Chignecto Mine occurred in the Bennet level. In these workings the top coal had fallen and ignited spontaneously. The day before, the fire had been, as it was supposed, securely built off, and the working reported safe. It was a level driven ahead of the main workings, to drain the surface water, and only a pair of cutters were employed. The ventilation was natural, and had hitherto been found ample. The air entering the level,

escaped at a small shaft near the face. The evening before the accident a holing for a travelling road from the main workings had been made into the level, near its mouth. This holing had not been closed, as at night-fall the ventilation appeared satisfactory, the holing casting up into the level, and the air going to its face. During the night the air reversed. In the morning, the underground manager, Mr. Patrick, who had some days before relieved the night watchman, whose duty it was to examine this level before the men went in, from doing this work, went in with the two miners. He returned and informed Mr. Baird, the manager, that, in his opinion, it was too foul for the men to continue working. He was instructed to return to close the holing referred to above, and the manager followed in a few moments to see if this step had purified the air. The miners, finding the place unfit to work in, instead of escaping by the air shaft, a few yards from their working place, attempted to return by the level, and were overcome by the stythe. Brave attempts were made to rescue them, and they were finally got out, with Mr. Patrick, who had also been overcome. Unfortunately, Mr. Burrows, one of the rescuing party, lost his life. Mr. Patrick was revived, but over-exerting himself in his weak state the following day, he was attacked by inflammation of the lungs, which shortly after proved fatal. Had Mr. Patrick, the underground manager, either gone in first himself, or sent some competent person, to examine the level before the entrance of the men, as required by the Mines Regulation Act, the accident would not have occurred.

In the case of D. Bailie, who was killed in the north slant of the McGregor pit, by the breaking of a coupling chain, which allowed a box to enter the landing where he was standing, it may be remarked that he had no business at the point where he was injured, and had left his post. The chain which broke was an English-made cage chain, specially tested and warranted considerably in excess of the actual load. On examination it was found to have parted at the weld. In this connection I would refer you to my remarks, under the head "Acadia Colliery," on chain testing.

The death of J. McKay, at the Intercolonial Colliery, brings up a point which, I am afraid, is not always remembered by those having charge of colliery engines. The pinion wheel of the little underground engine used in sinking the slopes broke, and the rake running back crushed the boy, who appeared unnecessarily to have been walking right behind the rake. The gradual distress and final rupture of pinion wheels, seems to be a question of usage, and after a certain time they become unsafe, and should be replaced by fresh castings. The judgment of the colliery engineer will frequently afford information, but under ordinary colliery usage, five years should not pass without renewal of such pieces.

The accident, No. 5, at the Vale Colliery, resulting in the death of eight persons, and the injuring of three others, was one of an unusually distressing character. The men, who had been engaged at various duties, started on a long wood car to ascend the slope. The

orders are that the bottomer put on a durkey whenever men ride in the coal boxes; he was riding himself, and not thinking it necessary, omitted to put on the durkey. When the car had gone a short distance the draw-bar broke, and as it ran back, there being no durkey, the men were thrown off, the bottomer himself being a sufferer. The draw-bar, on examination, proved to have an old flaw on one side of the bolt eye, and to have parted rapidly on the other side, presumably from the effect of some unnoticed severe cross strain or twist recently inflicted on it. The total tensile strength of the draw-bar, not considering the half rendered valueless by the old flaw, was 25.3 tons, for the quality of iron used. The load on the rope was 1.7 tons. At this colliery the tubs are regularly examined and over-hauled, and this car had been inspected by the head carpenter a few days before. The jury, after a prolonged investigation, conducted by Dr. Murray, coroner, of New Glasgow, exonerated the management, and recommended that special tubs be made for the men to ride in, and that the inspection of the boxes be carried still further. As slope riding is more dangerous than shaft riding, it is as well to have the men walk; in this mine, however, the great depth and heavy angle would be too much for them after a day's work. The idea of providing special boxes where men ride in slopes, has since been adopted at other collieries, and is worthy of imitation under similar conditions.

(7.) In the case of this accident, the man who fired the shot had not obeyed the rules of the mine to post himself, so as to give warning after lighting the fuse, consequently Rude was caught by the explosion on his way past and killed. The man who fired the shot left the locality at once.

(9.) The evidence in this accident appeared to show that the deceased had hold of the rope, and was last seen leaning over the shaft to talk to the sinkers below.

(10.) In this case the deceased undertook, in the absence of the regular driver, to take a box into one of the deeps by walking down in front of it; the box proved unmanageable, and knocking him down, crushed his head.

(11.) This accident occurred through disobedience to orders.

(12.) This accident was caused by fracture of the holding down bolt of the brake in a back balance wheel, and the handle of the lever flying up and striking the boy on the head.

As a large percentage of the preceding accidents were due to breakage of machinery, iron, etc., it would be well for colliery managers to consider if the unusual activity of the coal trade during the past few years has not led to a more rapid wear and deterioration of mining plant than was formerly the case.

Among the non fatal accidents may be mentioned two slight cases of burning by gas at the Albion Mines,—one due to disobedience of orders, and the other to carelessness.

Six accidents attended the use of powder. One at the International

arose apparently from the use of an iron stemmer; three at the Albion mines from unexpected ignition of shot. One accident arose from a man trimming his lamp over his powder can.

Several fractures of limbs were caused by falls of coal and roof. Two men were injured at the Sydney mines by the in-going rake. They had neglected to use the safety holes, and even then would have been safe had they stepped to the other side of the road where there was ample space. The slack box at the Springhill mine which travels up the rotary screen gangway, got off the track and fell a distance of some 30 feet, striking a man named Michael Burke. He wonderfully escaped without serious injury.

MISCELLANEOUS.

The following is a list of the men who have received certificates from the Board of examiners:—

CERTIFICATES OF COMPETENCY—UNDERGROUND MANAGERS.

Thomas Scott	Springhill.
Henry Swift	"
Thomas Routledge	Sydney.
Hugh Campbell	Cow Bay.
James Baird	Chignecto.
J. G. S. Hudson	Stellarton.
James Maxwell,	Westville.
Alex. McInnis	Springhill.
W. Campbell	Stellarton.

OVERMEN.

Alex. McDonald	Stellarton.
James Rogers	"
George Wilson	Chignecto.
A. L Edmunds	Cow Bay.
Ed. Wilkinson	Stellarton.
John Weir	"
W. Reese	Springhill.
M. Dunlap	Chignecto.
Francis Burrows	"
W. Lorimer	"
Allan C. McKinnon	Springhill.
John Maxwell	Stellarton.
Allan Caldwell	Sydney Mines.

CERTIFICATES OF SERVICE—UNDERGROUND MANAGERS.

John Dunbar	Stellarton.
R. Redpath	Minudie.
R. Wilson	North Sydney.
W. Conway	Spring Hill.

Henry Morley	Cow Bay.
John Johnstone	Bridgeport.
John Douglas	Stellarton.
Thomas Turnbull	Vale Colliery.
George Scott	Caledonia.
James Simpson	Sydney Mines.
W. McNamara	Lingan.
P. P. Burke	Joggins.
A. L. Anderson	Cow Bay.
W. Adamson	Glace Bay.

OVERMEN.

William Young	Lingan.
Angus McKeigan	Bridgeport.
George Kay	Sydney Mines.
J. B. Greenwell	"
John McKay	Stellarton.
Thomas Johnston	Cow Bay.
T. Fletcher	Reserve.
James Johnstone	Westville.
Ed. Harris	"
J. Bradley	Spring Hill.
Mat. Spoors	Vale Colliery.
W. Stafford	N. W. Territory.

I may remark that the answers of the candidates showed a very gratifying improvement. It is, however, apparent that in order to develop fully the opportunities offered, there should be a chance given to intending candidates to acquire the theoretical knowledge, which renders their practical skill more readily available both to anticipate and to overcome the unusual and unexpected difficulties which often confront the miner. So thoroughly has the necessity for a training in the principles which form the ground work of practice been recognised on the continent, that at some of the larger industrial works the proprietors themselves have opened schools where their workmen can receive technical training. The results of such schools have invariably been an increase in the quantity and quality of the work turned out, and a growth of good feeling between masters and men, which in some cases has practically banished strikes.

At some of our collieries the officials have given assistance to those among their men who have desired to improve themselves, but very much more could be done. Instruction in surveying, measuring, laying off work, etc., can be given without much trouble, and gradually there grows up in a colliery a class of men who are anxious to give and receive information, and who take a pride in facilitating the operations of the mine, a state of affairs which cannot but prove beneficial.

It is true that text-books supply all the information which too often the miner applies imperfectly, and from his individual and limited experience. Few men, even with the advantages of early

training and leisure, can acquire by their own reading a satisfactory knowledge of any professional subject, and the difficulties in the way of our candidates are much greater, as in our mining districts educational facilities are of a limited nature.

I would suggest, the matter is one well worth your consideration, and that the present school system could be utilized as a basis for providing lectures on chemistry, pneumatics, hydraulics, etc., to meet the needs of proposing candidates, and that courses of special lectures on mining matters could be arranged.

NON-CONDUCTING PIPE COVERING.

At a recent meeting of the American Society of Mining Engineers, Mr. Leavitt, consulting engineer of the Calumet and Hecla Mining Company, during a discussion on the use of non-conducting coverings for steam pipes, stated that at their mines five hundred feet of 8 inch pipes were used to carry steam from the boilers to the engines. The condensation amounted to several hundred gallons a minute when they were simply boxed up. On covering the pipes with a mixture of plaster and sawdust the condensation was reduced to less than one per cent. of what it was previously. The mixture is made by taking one part by volume of plaster of paris and two parts of sawdust, and is applied to the boilers or pipes in the state of mortar. When dry a layer of hair felting 1½ inches thick is put outside of it. The effect of this may be judged of from the fact that at the Calumet and Hecla mines, where the temperature frequently runs below zero during the winter, there is no appreciable difference between the amounts of fuel used under the boilers during the winter and the summer months, when the covering is applied in the manner referred to above.

HOWE CULM GRATE.

I also referred to the satisfactory tests made of the Howe Culm Grate at the Acadia Colliery, and give the following brief description of it, which will serve to show its peculiarities:—

"The Howe culm grate consists of the ordinary grate-bars, cast with holes through them, through which rods are passed carrying knife-edged rockers, which are connected together and are rocked by means of a lever in front of the furnace. The grate-bars, spaces and rockers are made equal in width, and the bars are preferably made full length of furnace, and divided up so that the rockers are arranged to break joints, which prevents the fire being left in ridges. Among the advantages claimed for this new grate are these: That culm, small-sized anthracite, and bituminous coal can be successfully burned and thoroughly cleaned on it, and make as much steam as large size coal; that it can be cleaned in two minutes without the use of the poker, and without the loss of steam, as the doors are opened only when feeding the fire; that it breaks up clinker and cinder by means of the knife-edged rockers, and forces them through the grate; that it has nearly sixty per cent. air space, which insures good combustion; and that, as the bars are of simple construction, they are not likely to get out of order."—*Am. Mining Journal.*

BOILER INSPECTION.

The report of the Hartford Steam Boiler Insurance Company always presents many points interesting to those who have charge of boilers. From a study of the defects and dangers found by their inspectors, the colliery engineer may frequently guard more effectually against common defects, and have his attention turned to sources of danger possibly hitherto overlooked.

From their annual report for the year 1882 we learn that 33,690 defects were reported to boiler owners, of which 6867 were considered dangerous and requiring immediate attention. The following detailed statement shows the various defects.

Nature of defects.	Whole number.	Dangerous.
Cases of deposit of sediment	3,138	467
Cases of incrustation and scale	4,913	450
Cases of internal grooving	237	112
Cases of internal corrosion	1,210	232
Cases of external corrosion	1,803	437
Broken and loose braces and stays	613	293
Defective settings	935	158
Furnaces out of shape	1,030	204
Fractured plates	1,801	902
Burned plates	1,084	412
Blistered plates	2,853	385
Cases of defective riveting	4,807	535
Defective heads	386	149
Serious leakage around tubes	3,414	845
Serious leakage at seams	1,957	342
Defective water-gauges	640	146
Defective blow-out apparatus	290	118
Cases of low water	131	84
Safety-valves overloaded	358	136
Safety-valves defective in construction	238	99
Defective pressure-gauges	1,808	344
Boilers without pressure-gauges	43	14
Defective feed-pipe	1	1
Dangerous defects unclassified by inspectors	..	2
Total	33,690	6,867

BAROMETER.

The last volume of the Transactions of the North of England Institute of Mining Engineers contains a valuable contribution by Mr. V. W. Corbett on Water-gauge Barometer, and other observations taken at Seaham Colliery during the time the Maudlin seam was sealed up.

The terrible explosion at Seaham Colliery on the 8th September, 1880, causing the death of 164 men and boys, will be fresh in the minds of all colliery managers. After the pit was re-opened, the workings in the Maudlin seam were found to be on fire at some temporary

stables. They were cut off by stoppings in which water-gauges were placed, provision being also made to prevent damage to the stoppings by any undue accumulation of gas. Barometers were placed at these stoppings and at bank. A gas check was provided in another district of the pit where there was a large goaf, opening out into the workings. The check consisted of a level about 50 yards long leading from the return airway to the goaf and kept open.

The water-gauges and barometers were observed and recorded for about six months. The gas check was also observed by a man noting regularly the distance from the goaf at which gas was found in the level, thus furnishing a record of the effects produced on the goaf gas by atmospheric changes of pressure. The recorded readings of the numerous instruments employed in this investigation form a very interesting paper, which cannot be reproduced here, and the summaries arrived at may prove suggestive to our colliery managers.

The writer remarks: "The first comparison between the water-gauge and the barometer permits the following deductions to be made:—1. The extreme sensitiveness of the water-gauge in marking every fluctuation of the atmospheric pressure on the gases in the sealed up workings. 2. The great tardiness of the barometer in recognizing these fluctuations."

It is apparent from the water-gauge diagram that fluctuations of gases in colliery workings must be occurring almost every hour. These frequent fluctuations seem to be clearly defined by the water-gauge whenever they take place, but they are not correspondingly recognized by the barometer, and it appears that the barometer only recognizes what may be termed general or clearly defined great fluctuations, and even then very slowly. In several instances when the water-gauge has shown an inbye pressure prevailing, and the pressure having reached its limit, an outbye pressure commences, indicating that gas has commenced coming off, it is found that the barometer still continues to mark an upward tendency.

The fourth comparison between the barometer and gas check clearly indicates the unreliableness of the barometer. In a few cases the barometer is seen to act before gas is found in the gas check, but generally it is not a true indicator to mark the giving off of gas; and it is well known that gas is frequently found in colliery workings before any fall of the barometer commences. It may be urged that frequently the gas check and barometer work together,—and this is true to some extent; at the same time, however, the water gauge proves during part of this time that the pressure was out-bye, whilst, had the barometer alone been consulted, an in-bye pressure would have been indicated. In fact, the barometer, so far as an indication showing that gas may be expected, cannot be said to be reliable. Unlike the readings of the water gauge, those of the barometer, showing absence of gas, are so widely different that it is impossible to assume any general rule as to when the pressure of gas may be expected.

One lesson suggested by the water-gauge, barometer, and gas check readings is, that as an instrument for the use of all connected with colliery operations, the water-gauge may be found preferable to the barometer; and that if a water-gauge is connected with a sealed up working, its readings indicate nearly accurately the giving off or otherwise of gas in a colliery, which the barometer fails to do.

If the above system of ascertaining when gas may be given off in mines can be further substantiated, and put into actual use at collieries, it will doubtless prove of much greater service than placing too much reliance on an instrument, so uncertain in its action in indicating gas as the barometer.

The question of the extent of the reliance to be placed on the barometer as a gas warner in coal mines has received much attention of late years. In my report for the year 1880 I referred to the subject, and pointed out that even a superficial consideration of the matter showed that the number of points on which it could warn was not as numerous as had been claimed.

The summary of Mr. Corbett's paper, given above, throws some light on this important subject, and it appears that the first step must be the construction and study of a barometer many times more sensitive than the mercurial balance. It would next appear important to have the subject of the effect of atmospheric pressure on the strata of the earth, and the effect of the passage through coal mining districts of seismic vibrations carefully examined. Should investigations in this direction prove that the varying pressures of the atmosphere are coupled with other forces in the exudation and accumulation of gas, we may hope that, instead of pinning our faith on an ordinary mercurial barometer, warnings may be given from a central point where the causes above and below ground could be worked out for general cautionary signals.

IRON STEMMERS, ETC.

Mr. Neville, in his report, alludes to the dangers attending the use of iron needles, stemmers and tin castors. In England for some years these tools have been made of copper, and the powder put up in cartridges. It is, however, well known that perfect safety is not secured by the use of the softer metal, and accidents have been caused by it in our own mines. Phosphor bronze is said to be safer than copper; and recently a still softer metal has been tried with success. It is hardly to be hoped that with the common system of charging holes complete immunity from accident can be secured, as two particles of pyrites or hard-stone when violently driven together, not unfrequently give off sparks. There have been so many accidents from sparks falling into powder cans, etc., in our coal mines, that it would almost appear necessary to have some system introduced of carrying the powder to the working places, and charging the holes, without its being exposed to risks of premature ignition. Should the new metal, now being experimented with, prove successful, an effort should be made to compel the use of implements which can in any way prevent this painful class of accidents.

SAFETY COUPLINGS.

The following plan may often be advantageously adopted as a safeguard in the case of the couplings between any two boxes, or between the leading box and the rope, breaking when the rake is ascending. It consists of a chain passing under all the boxes and fastened to the rope. The use of "durkeys" is not always to be relied on as a sure stopper of loose boxes, as unless long enough to get a proper hold the boxes sometimes override; and they cause annoyance at bankheads and elsewhere if for any reason it is necessary to stop the rake, as they frequently lift one or two boxes off the track. It is true that most breakages occur with an ascending rope, but those which happen with a descending rope are more difficult to meet. An arrangement on the following principle might be found effectual in the case of the breakages just alluded to when the rake is descending. The durkey on the leading box being made to turn on a pivot, the up end being attached by a light chain to the rope, and tightened to lift the point clear, then any breakage snapping the chain the point of the durkey would fall to the floor. Both of these arrangements would be useless in the case of a breakage in the rope itself.

THE FEEDING AND MANAGEMENT OF COLLIERY HORSES.

The subject has been very fully treated in a paper read before the Newcastle Mining Institute by Mr. Charles Hunting. Some of his views may not quite accord with the experience of this country, but the following outline of his paper will serve to bring the matter before those having charge of colliery horses, and to suggest several points of interest.

The age of horses bought for pit use should be between five and seven years. The practice of taking a new horse and sending him at once into the pit is open to serious objections. The horse is generally out of condition, and in such cases is more liable to accident and disease than if he had been properly fed and worked, first at bank for a few weeks. There is also the risk of introducing disease among the pit horses.

In order that the most effective results may be got from pit horses, it is indispensable that they be regularly worked and kept in good condition. Usually this is attained by work and plenty of good oats and hay, but experience has shown that equally good results can be got at a cost less than that usually incurred for animals doing light work.

High Feeding is economical under these conditions.

1. The selection of the cheapest but best food.

2. Giving that food in the form most favorable to digestion.

3. The prevention of waste.

Food may be defined as the material supplied to build up or replace the tissues of the body, which consists of nitro-genous, fatty

and saline compounds. These two leading compounds, nitro-genous and fatty matters, which are found in all animal and vegetable bodies, are the most important in relation to horse-feeding. The flesh or muscle being derived from the nitro-genous constituent of vegetables, such as oats, barley, beans, etc., and the maintenance of animal heat being due to the fatty and starchy constituents of the food.

The following table, therefore, shows the value of various foods for providing the chief requirements of the animal under consideration:

	Water.	Woody Fibre.	Starch, Gum, Sugar and Fat.	Nitro-genous matter.	Ash or Saline.
Beans or Peas	14·5	10·0	46·0	26·0	3·5
Barley	13·2	13·7	56·8	13·0	3·3
Oats	11·8	20·8	52·0	12·5	3·0
Maize	13·5	5·0	67·8	12·29	1·24
Hay	14·0	34·0	43·0	5·0	5·0
Carrots	85·7	3.0	9·0	1·5	·08

The evidence of this table is shown by the practical success of the Banting system, the inadequacy of hay alone to support working horses, and the success attending the uses of beans and peas as a soldier's food for meeting the waste of muscular tissue during a campaign. The figures in the table require, however, physiological knowledge, showing that woody fibre is indigestable, and that a certain bulk of food is required for proper digestion, and that some foods such as linseed, maize, bran, cause laxity of the bowels, while others tend to produce constipation.

When these various foods and their comparative cost are considered the following points are apparent: First, for moderate work, where cost is not an item to be considered, hay and oats form an excellent food. When, however, hard work is required from the horse, no single grain can alone preserve both health and condition. The fact is either the chemical or physiological action is defective, and it is only by mixing foods and altering their nutritive value, that a food can be produced to supply all the requirements of the body without deranging its functions. When, therefore, the chemical, physiological, and money values of foods are known, the best and cheapest food can be selected, that is to say, that mixture of foods which gives the largest amount of feeding material at the lowest possible cost.

The writer gives the following instance of the insufficiency of hay and oats alone to maintain proper condition under the heavy loads and long hours imposed frequently on pit horses.

At a colliery in Durham the output decreased from the inability of the horses to get the work out, as they were all very much run

down. The feed allowed consisted of 168 lbs. of oats and 154 lbs. of hay per week, the oats not being crushed and the hay not being chopped. The horses were comparatively large animals, none being under 16 hands.

Their food was changed to

	S.	D.
Crushed Peas, 35 lbs. @ 34s. per qtr.....	2	4
" Barley, 20 lbs. @ 28s. "	1	3
" Oats, 40 lbs. @ 28s. "	3	4
Bran, 14 lbs. @ 7½d. per stone.....		7½
Hay, 7 stones @ 9d. per stone	5	3
	12	9½

The old plan being:

Oats, 168 lbs. @ 28s. per quart	14		
Hay, 11 stones @ 9d. per stone.....	8	3	
	£1	2	5

This shows a saving of 9s. 5½d. per week per horse, and the digestive organs of each horse had 115 lbs. less of food to digest. Within three months the horses were doing their full quota of work with ease. As there were 149 horses in the colliery there was an annual saving of £3,664 effected.

The attendance on the horses is frequently not marked by the care and thoughtfulness due to the services of so valuable an animal. At most mines it has became a maxim that a man who is past other work is particularly fitted to take charge of horses. Such a man is sometimes required to attend to thirty or forty horses, when to give the attention necessary for proper cleaning, grooming, watering, etc., half that number is an outside allowance.

The following table of cost, etc., of Australian milling is interesting for comparison with Nova Scotia experience:

TABLE SHOWING WEIGHT OF STAMPS, &c., USED IN AUSTRALIAN GOLD MINING.

Name of District.	Weight of Stamps.	Cost per stamp.	Fall of Stamp.	Strokes per minute.	Quartz per Stamp per 24 hours.	Holes in Grating per sq. inch.	Horse pow'r to work each Stamp.	Water used per Stamp per hour.	Mercury in ripples per Stamp.	Mercury lost per S. per wk.
	cwts.	£ s. d.	inches		tons. cwts.			Gals.	Lbs.	Ozs.
Ballarat.....	3–9	12s.–£1	7–14	50–83	1.4–3.17	75–256	7/10–1⅓	24–770	2–32	½–22
Beechwort.....	3–13	16s.–£3	5–20	40–90	1–2.15	80–260	¾–2½	40–120	9–56	½–4
Sandhurst	6–8	14s.–£1.10	6–12	60–65	1–2.10	80–200	1	255	6–36	1
Maryboro'.....	5–8	14s.–£1.12	7–12	60–76	1.8–2.14	81–290	1–1¼	320–900	2–20	1–12
Castlemaine....	6–8	14s.–£1.12	7–12	60–75	/10–2	81–200	½–1	240–660	4–20	½–18
Ararat	6–9	£1.2–1.12	6–10	70–75	1.1–2.10	120–342	½–1¼	528–800	20–75	6 29
Gippsland.....	1–8	£1.2–£5	6–40	18–80	16–2.16	602–40	1–2	60–480	5–38	½–10

The following papers relating to the Geology and Mineralogy of Nova Scotia have been read during the year:

E. GILPIN.—The Folding of the Carboniferous in Nova Scotia. Royal Society of Canada.

E. GILPIN.—An Analysis of a Pictou Coal Seam. N. S. Institute of Natural Science.

C. HOFFMAN.—Canadian Geological Survey, Mineralogical Report.

DR. HONEYMAN.—Geology of Hants and Colchester Counties. N. S. Institute of Natural Science.

Polariscopic Examination of Crystaline Rocks from Yarmouth: *ibid.*

Glacial Transportation in Nova Scotia: *ibid.*

I have the honor to be, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,
Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area. Sq. Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, Sarah, and others		1
	COLCHESTER COUNTY.		
	Moir, Wm. C., et al	Tatamagouche	10½
	CAPE BRETON COUNTY.		
104	McKenzie, H. R., and others		1
105	Burchell, J. E.		1
106	Burchell, G. L., and others		1
	LEAD.		
	HALIFAX COUNTY.		
1	McClure, Chas. F.	Gay's River	1
	IRON.		
	PICTOU COUNTY.		
44	Hudson, James	East River	1
43	Hudson, James	" "	1
	CAPE BRETON COUNTY.		
86	Brookman, Phœbe	N. Side East Bay	1
91	C. L. Ingraham	East Bay	1
	Total area under lease		square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—*Continued.*

No	Lessee.	District.	Area Sq. Miles.
	IRON.—Continued.		
	CAPE BRETON COUNTY.—*(Continued.)*		
102	C. L. Ingraham	East Bay	1
103	J. A. McKenzie	" "	1
92	Matheson, D., et al	" "	1
93	Brookman, S. J., et al	" "	1
84	Protheroe, Pryse	Cow Bay	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co	Whycocomagh	1
	Total area under lease		25½ square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles	Working.	Agent and *Manager*.	Postal Address.
		ANTIGONISH CO.				
1	McKinnon, et al		3			
		CUMBERLAND CO.				
44	Baker, John W		1			
13, 14, 15	Black, C. H. M		3			
21	Blight, James, et al		1		M. Dunlop	River Herbert.
47	Boston, C. M. Co		1		John Moffatt	" "
25	Campbell, Alex. et al		1			
32, 34	" " "		2			
35, 48, 49, 50	" "		4			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, John		8			
12	Cumberland, C. M. Co	Chignecto	4	Working.	*Jas. Baird*	Maccan.
17	Domville, James		3		E. N. Sharp	St. John, N. B.
	Joggins, C. M. Association.	Joggins	2	Working.	B. B. Barnhill	Joggins.
	Joggins C. M. Co	Cumberland	2			
20	Kirby, Lewis R		1			
18, 19	Livesey, John		2			
5	Lawson, C. M. Association.	Maccan	1			
42	Macfarlane, Alex		1			
51	Milner, Christopher		1			
53	" "		1			
1, 2, 3, 4	New York & Acadia Co	Scotia	4	Working.		Maccan.

43	Pugwash & Sp'ng H'l R.Co.		1			
16	Seaman, Gilbert		1		R. Redpath	River Herbert.
24	Shannon, S. L.		2			
36, 39	Shannon, S.L.(in trust)et al		2			
6, 7, 8	Spring Hill Mining Co.	Spring Hill	3	Working.	*William Hall*	Spring Hill.
52	" " " "	" "	4	"	" "	" "
22, 23, 28, 29, 30	Styles Mining Co. (L'td)		5		J. S. Hickman	Amherst.
9	Victoria Coal Mining Co.		2			
26, 27	Wright, John V		3			
			66			
		PICTOU CO.				
1	Acadia Coal Co	Fraser	1	Working.	H. S. Poole	Stellarton.
3	" " "	Acadia	1	"	*J. Maxwell*	Westville.
42	" " "	Pictou	4			
23	Allan, Sir Hugh, K't	Vale	3	Working.	J. B. Moore *John Greener*	New Glasgow. Vale Colliery.
10	Gray, B. G.		1			
11	Halliburton, R. G., et al		1			
	Halifax Co'y, (Lt'd)	Albion	4	Working.	S. Cunard & Co *J. Rutherford*	Halifax. Stellarton.
13, 14	Intercolonial Co'y		2			
12	" "	Drummond	1	Working.	Robert Simpson	Westville.
6	Kirby, Lewis R		1			
15, 30, 31	Merigomish Co'y		3			
25	Nova Scotia Co'y	Black Diamond	4		M. H. Angell	Westville.
20	Price, D. E., et al		2			
24	Richey, M. H.		1			
			29			

LIST OF COAL LEASES—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and *Manager*.	Postal Address.
		CAPE BRETON CO.				
3	Archibald, Blowers	Gowrie	1	Working.	Archibald & Co. *Chas. Archibald*	North Sydney Cow Bay
2	Archibald, Thos. D.	"	1			
5, 28	Blockhouse Mining Co.	Blockhouse	2	Working.	R. Belloni	Cow Bay
29	" " *(sea area)*		1			
72	Brookman, Samuel		1			
76, 77	" S., et al		2			
15	Caledonia C. & R. Co.	Caledonia	1	Working.	David McKeen	Caledonia Mines
31	" *(sea area)*		1			
30	Campbell, Alex		1		T. D. Archibald	North Sydney
23, 25, 70	Cape Breton Co. (Limited)		3		F. C. Kimber	Louisburg
14, 24	" " " "	Schooner Pond	2		*W. Routledge*	Reserve Mines
49	" " " "	Reserve	1	Working.	"	"
64, 65, 68	" " " "	Lorway	3		"	"
69	" " " "	Emery	1		"	"
8, 9	Halifax Coal and Iron Co.	Ontario	1½	Working.	*John Sutherland*	Port Caledonia
87	Cossit, Geo. G.		1			
	General Mining Association	Bridgeport	2		Richd. H. Brown	Sydney Mines
	" " "	Sydney	5	Working.	Cunard & Morrow	Halifax
	" " "	"	12			
27	" " *(sea area)*	"	5		*Joseph Simpson*	Sydney Mines
	" " "	Lingan	10	Working.	*Donald Lynk*	Lingan
	" " "	"	4			
38, 39	" " "	"	10			

10, 21	Gibson, John, et al		2			
4, 12, 16	Glace Bay Mining Co	Glace Bay	3	Working.	E. P. Archbold. / Chas. Rigby	Halifax. / Lit. Glace Bay.
75	Henry, W. A.		1			
22	Ingraham, R. J. and J. L.	Halfway	1			
6, 13, 18, 19	International C. & R. Co.	International	4	Working.	R. Belloni / *P. Johnstone*	Cow Bay. / Bridgeport.
71	Jennings, Edward		1			
47	LeCras & McInnes		1			
66	Merchants' Bank of Canada	Gardener	2			
74	Moore & Moseley		1¼			
81	Morton, Lemuel J		1			
80	McDonald, James		1			
101	McDonald, W. B		1			
52, 53	McLeod, Hugh		2			
88, 89, 90	Paint, Henry N., and others		3			
83, 85	Protheroe, Pryse		2			
73, 82	Reid, Thos. S. *(sea area)*		2			
40, 41, 42	Ross, H. E., et al		3			
79	Ross, W. J., et al *(sea area)*		1			
43	South Head Coal Co	South Head	1			
32	Sword, Wm. *(sea area)*		3			
54 to 62	Sydney C. M. Co. *(sea areas)*		10			
46	Todd, A. Thorton	Collins	1			
67	Weatherbe & Kirby		1			
78	Weatherbe, R. L. *(sea area)*		5			
34, 35, 36	Victoria C. M. C. *(sea area)*	Victoria	5			
50, 51	" "		2	Working.	D. Lynk	Low Point.
			131¾			

LIST OF COAL LEASES — (CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and *Manager*.	Postal Address.
		INVERNESS CO.				
5	Aylmer, John Evans Freke..	Cape Mabou	2			
8	Evans, Thomas	Chimney Corner..	1	Working.	Thos. Evans.....	
9	Evans, Thomas *(sea area)*...	.....	1			
7, 12	Inverness C. I. & R. C.....	.....	2		Alex. Wright.....	Moncton.
13	Murray, George	Port Hood.....	3			
4	Richey, M. H. et al.	.....	1			
11	Ross, W. J.....	Broad Cove.....	1			
6	Ross, H. E. et al, *(sea area)*..	.....	1			
14, 15	Smyth, Peter.....	.....	2			
10	Tremaine, E. D., (*sea area*)..	.....	1			
17	McDonald, Hugh	.....	1			
			16			
		RICHMOND CO.				
2	Marmaud, A. E.....	Little River.....	1			
			1			
		VICTORIA CO.				
2	Campbell, Chas. J.....	New Campbellton.	3		John McDonald ..	New Campbellton.
3, 4, 5	Ross, William	Black Rock.....	5			
			8			

Total area under lease..... .....255¼ square miles.

TABLE A.—COAL TRADE BY COUNTIES.

	Cumberland.		Pictou.		Cape Breton.		Other Counties.		Totals.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	59,342	49,198	113,114	78,565	80,781	14,231	.....	.....	253,237	141,994
2nd Quarter	66,039	58,644	127,373	116,756	176,269	149,753	.....	.....	369,681	325,153
3rd Quarter	56,808	55,213	148,605	156,602	250,665	287,098	.....	.....	456,078	498,913
4th Quarter	65,672	59,292	116,534	109,886	160,578	161,532	773	753	343,557	331,463
Total	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179
1881	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014
1880	143,085	134,671	461,811	434,922	422,884	380,848	4,930	4,218	1,032,710	954,659

TABLE B.—COAL TRADE BY COUNTIES.

	Cumberland.		Pictou.		Cape Breton.		Other Counties.		Total.		Grand Total.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia											
Land Sales..	23,140	16,262	110,547	103,492	2,019	3,801	5	.....	135,711	123,555	259,266
Sea borne.....	4,265	64	38,913	8,028	152,832	7,610	349	.....	196,359	15,702	212,061
Total Nova Scotia..	27,405	16,326	149,460	111,520	154,851	11,411	354	.....	332,070	139,257	471,327
Quebec.....	43,582	2,901	143,568	1,959	216,720	1,875	.....	.....	403,870	6,735	410,605
New Brunswick...	80,710	47,041	5,553	1,849	32,497	30	60	.....	118,820	48,920	167,740
Newfoundland	.....	.....	3,336	.....	57,983	359	.....	.....	61,319	359	61,678
P. E. Island.....	.....	.....	15,155	23,467	7,407	1,720	273	66	22,835	25,253	48,088
West Indies.....	.....	.....	1,079	.....	30,617	164	.....	.....	31,696	164	31,860
United States.....	756	3,626	1,708	3,122	39,973	53,570	.....	.....	42,437	60,318	102,755
Other Countries...	.....	.....	.....	33	3,371	66	.....	.....	3,371	99	3,470
Total.....	152,453	69,894	319,859	141,950	543,419	69,195	687	66	1,016,418	281,105	1,297,523
1882...	151,281	67,068	329,350	116,787	522,325	63,245	125	.....	1,003,079	247,100	1,250,179
1881.....	127,756	49,413	257,573	89,395	446,649	70,203	45	.....	826,003	209,011	1,035,014
1880.....	99,491	35,180	326,870	108,052	346,103	34,745	4,218	.....	776,681	177,977	954,659

COAL.—Sales.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1883.	Year 1882.
Nova Scotia.						
Land Sales.	71,168	61,259	52,034	74,805	259,266	238,828
Sea borne..	4,831	50,467	78,623	78,140	212,061	220,124
N. Scotia—Tl	75,999	111,726	130,657	152,945	471,327	458,952
Quebec.....	28,522	120,596	214,572	46,915	410,605	383,031
N. Brunswick	30,617	42,170	49,322	45,631	167,740	153,617
Newfl'd.....	1,372	9,890	22,105	28,311	61,678	79,732
P. E. Island..	57	11,922	23,587	12,522	48,088	50,096
United States	3,552	23,047	46,917	29,239	102,755	99,302
West Indies..	1,875	5,597	11,266	13,122	31,860	22,386
S'th America.	.....	205	487	2,778	3,470	1,462
Europe.....	.....	.....	.....	.....	.....	1,601
Total....	141,994	325,153	498,913	331,463	1,297,523	1,250,179
1882..	121,898	256,987	494,038	377,256	1,250,179	1,250,179
1881..	94,219	246,475	396,612	297,708	1,035,014	1,035,014

COAL.—General Statement.

1883.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	253,237	141,994	31,451
2nd Quarter..... "	369,681	325,153	26,213
3rd Quarter..... "	456,078	498,913	24,192
4th Quarter..... "	343,557	331,463	30,093
Total.....	1,422,553	1,297,523	111,949
1882.....	1,365,811	1,250,179	111,381
1881.....	1,124,270	1,035,114	107,888
1880.....	1,032,710	954,659	96,831

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1883.

Collieries.	Produce.	Sales.				Colliery Consumption.		
		Paying Royalty.	Free.	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
Cumberland County.								
Chignecto	23,395	15,889	2,730	18,619	77	1,961	341	9
Joggins	26,698	16,618	4,651	21,269	81	2,815	417	12
Lawrence	59	50	50	100	...	.....	6	...
Milner	108	108	.....	108	...	.....	.....	...
Minudie	4,451	3,355	526	3,881	87	477	108	10
Spring Hill	193,161	115,857	61,816	177,673	92	10,670	3,342	7
Scotia	589	576	121	697	...	.....	.....	...
Pictou County.								
Acadia	115,028	69,532	37,082	106,614	92	6,813	1,916	7
Albion Mines	168,231	89,386	59,399	148,785	88	8,585	3,711	7
Intercolonial	147,711	103,214	34,353	137,567	93	6,795	2,949	6
Vale	74,656	57,727	11,116	68,843	92	6,899	1,260	10
Cape Breton County.								
Block House	55,300	51,777	14	51,791	93	2,981	1,558	8
Caledonia	51,500	39,314	12,243	51,557	100	1,430	888	4
Glace Bay	75,848	70,118	2,559	72,677	95	2,551	1,688	5
Gowrie	73,290	55,659	14,884	70,548	96	1,201	1,038	3
International	99,018	83,252	13,745	96,997	97	1,500	1,294	3
Lingan	16,482	12,818	100	12,918	78	2,200	854	2
Ontario	22,038	18,796	726	19,522	88	1,155	474	7
Reserve	110,456	89,581	15,196	104,777	94	3,571	3,980	6
Sydney Mines	162,866	121,968	9,705	131,673	88	16,002	7,595	10
Victoria	1,495	136	18	154	...	470	454	...
Victoria County.								
New Campbellton								
Inverness County.								
Chimney Corner	773	687	66	753				
	1,422,553	1,016,418	281,105	1,297,523	... ..	78,076	23,873	

Statement of the Numbers and Classes of Persons employed, and average results at each Colliery, during the year ended December 31st, 1883.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.		TOTAL.		AVERAGE No. OF DAYS PER PERSON.		Average No. of Tons per Cutter.	Average Tons per day per Cutter.	Average quantity raised per day, tons.	HORSES.		PITS WORKED.
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Day's Labor.	Persons.	Days' Labor.	Persons.	Days' Labor.	Under ground.	Above ground.				Above.	Below.	Days.
CUMBERLAND.																				
Chignecto	41	10	13	14,880	8	20	7	9,712	...	.....	99	24,592	230	277	570	2.6	107	5	2	217
Joggins	54	23	8	23,512	10	30	3	10,348	2	748	130	34,608	276	240	483	1.7	96	6	6	271
Lawrence	.....	...	...	....	...	...	...	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milner	4	1	...	62	4	...	2	52	...	.....	11	114	.....	.....	.....	.....	.....	1	.....	90
Minudie	14	3	1	3,474	5	9	1	3,164	5	915	38	7,553	192	210	318	1.2	17	1	.....	261
Spring Hill	196	99	74	106,675	38	77	15	37,759	9	2,701	508	147,135	289	290	985	3.4	678	5	18	289
Scotia	9	4	...	732	2	...	...	142	...	.....	15	874	.....	.....	.....	.....	.....	1	.....	60
PICTOU CO.																				
Acadia	88	81	24	51,093	22	44	7	21,715	...	.....	266	72,808	295	297	1,307	4.6	410	6	6	278
Albion	226	102	57	90,678	81	141	37	66,821	...	.....	644	157,499	235	257	880	3.3	640	12	16	262
Intercolonial	162	72	82	76,843	33	69	11	33,328	11	3,150	440	113,321	243	294	910	3.2	521	10	13	283
Vale	148	37	14	47,236	43	52	5	34,988	...	.....	299	82,234	237	349	504	2.3	344	5	15	217
CAPE BRETON CO.																				
Block House	62	7	34	19,081	23	39	6	18,308	21	584	192	43,237	185	268	891	4 8	302	14	23	183
Caledonia	74	9	21	17,479	16	37	9	13,628	7	1,553	163	32,660	168	262	695	4.7	350	6	14	147
Glace Bay	125	9	18	23,672	23	29	3	15,591	1	372	208	39,635	155	247	606	3.0	395	7	7	197
Gowrie	94	13	34	30,674	19	41	12	18,333	...	.....	213	49,007	233	254	779	3.7	355	8	20	206
International	107	24	49	48,185	32	84	2	28,748	1	134	299	77,068	267	243	925	4 5	544	6	36	182
Lingan	30	5	9	10,010	2	25	17	7,454	...	.....	88	17,464	227	169	549	2.1	63	3	5	260
Ontario	46	4	7	8,953	7	14	7	5,530	...	.....	85	14,483	157	194	479	3.2	147	8	4	149
Reserve	147	18	35	34.305	25	27	9	14,634	1	225	262	49,164	171	240	751	3.2	470	4	17	235
Sydney	246	36	83	85,300	61	105	39	58,134	...	.....	570	143.434	233	283	662	2.6	655	13	36	247
Victoria	17	6	...	5,582	5	29	3	9,983	22	5,690	82	21,255	242	270	.....	.....	.....	4	.....	301
INVERNESS CO.																				
Chimney Corner	8	2	...	1,189	1	3	...	592	...	.....	14	1,781	118	148	.....	.....	.....	.....	1	100
VICTORIA CO.																				
New Campbellton	6	...	.	165	1	2	..	46	...	.....	9	211	.....	.....	.....	.....	.....	1	.....	.....
Total	1904	565	563	699,780	461	867	195	409,020	80	2,337	4635	1,130,137	230	262	748	3.3	.....	96	241	226

COLLIERY CONSTRUCTION ACCOUNT — 1883.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	TOTAL.
CUMBERLAND CO.											
Chignecto	$		835 00			195 00	300 00			100 00	1430 00
Joggins			4600 00	2600 00	400 00						7600 00
Lawrence											
Milner	11 00	60 00	13 00	7 00				45 00	7 00	900	152 00
Minudie		2411 00	1126 00	2500 00	1000 00	1600 00	1150 00	3475 00	300 00		13562 00
Spring Hill		2539 00		24498 00	650 00	1669 00	1620 00	184 00			31160 00
Scotia	200 00		202 00					38 00			440 00
PICTOU CO.											
Acadia											
Albion				18 00	28 00		40017 00				40063 00
Intercolonial	1200 00	2874 00		5329 00	6147 00			507 00			16057 00
Vale		2190 00	2695 00	8507 00							13392 00
CAPE BRETON CO.											
Block House	7100 00										7100 00
Caledonia			688 00			350 00		857 00	1600 00		3495 00
Glace Bay			109 00	246 00					600 00		955 00
Gowrie			1333 00								1333 00
International					1702 00						1702 00
Lingan			484 00								484 00
Ontario			906 00			189 00	325 00				1420 00
Reserve	100 00		2527 00			2000 00					4627 00
Sydney Mines											
Victoria		6364 00	3721 00	1465 00	1264 00	220 00	915 00	6225 00	4562 00		24736 00
VICTORIA CO.											
New Campbellton											250 00*
INVERNESS CO.											
Chimney Corner			600 00			150 00	150 00	250 00	200 00		1350 00
Total	$8611 00	16438 00	19839 00	45170 00	11191 00	6373 00	44477 00	11581 00	7269 00	109 00	171308 00

*Repairs.

Nova Scotia Coal Sales, from 1875 to 1883 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668		1831	37,170	Forw'd 368,196
1786	2,000		1832	50,396	
1787			1833	64,743	
1788	10,681		1834	50,813	
1789			1835	56,434	
1790			1836	107,593	
		14,349	1837	118,942	
1791	2,670		1838	106,730	
1792	2,143		1839	145,962	
1793	1,926		1840	101,198	839,981
1794	4,405		1841	148,298	
1795	5,320		1842	129,708	
1796	5,249		1843	105,161	
1797	6,039		1844	108,482	
1798	5,948		1845	150,674	
1799	8,947		1846	147,506	
1800	8,401		1847	201,650	
		51,048	1848	187,643	
1801	5,775		1849	174,592	
1802	7,769		1850	180,084	1,533,798
1803	6,601		1851	153,499	
1804	5,976		1852	189,076	
1805	10,130		1853	217,426	
1806	4,938		1854	234,312	
1807	5,119		1855	238,215	
1808	6,616		1856	253,492	
1809	8,919		1857	294,198	
1810	8,609		1858	226,725	
		70,452	1859	270,293	
1811	8,516		1860	322,593	2,399,829
1812	9,570		1861	326,429	
1813	9,744		1862	395,637	
1814	9,866		1863	429,351	
1815	9,336		1864	576,935	
1816	8,619		1865	635,586	
1817	9,284		1866	558,520	
1818	7,920		1867	471,185	
1819	8,692		1868	453,624	
1820	9,980		1869	511,795	
		91,527	1870	568,277	4,927,339
1821	11,388		1871	596,418	
1822	7,512		1872	785,914	
1823			1873	881,106	
1824	27,000		1874	749,127	
1825			1875	706,795	
1826	12,600		1876	634,207	
1827	12,149		1877	697,065	
1828	20,967		1878	693,511	
1829	21,935		1879	688,628	
1830	27,269		1880	954,659	7,377,428
		140,820	1881	1,035,014	
			1882	1,250,179	3,582,716
			1883	1,297,523	
				Total.....	21,029,287

SUMMARY.

1785 to 1790.....	14,349	1841 to 1850.....	1,533,798
1791 " 1800.....	51,048	1851 " 1860.....	2,399,829
1801 " 1810.....	70,452	1861 " 1870	4,927,339
1811 " 1820	91,527	1871 " 1880.....	7,377,428
1821 " 1830	140,820		
1831 " 1840.....	839,981		

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1867	338,492	$1.25
1851	116,274	"	1868	228,132	"
1852	87,542	"	1869	257,485	"
1853	120,764	"	1870	168,180	"
1854	139,125	Free.	1871	165,431	"
1855	103,222	"	1872	154,092	.75
1856	126,152	"	1873	264,760	"
1857	123,335	"	1874	138,335	"
1858	186,743	"	1875	89,746	"
1859	122,720	"	1876	71,634	"
1860	149,289	"	1877	118,216	"
1861	204,457	"	1878	88,495	"
1862	192,612	"	1879	51,641	"
1863	282,775	"	1880	123,423	"
1864	347,594	"	1881	113,728	"
1865	465,194	"	1882	99,302	"
1866	404,252	"	1883	102,755	

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—General Statement for the Year 1883.

Shewing the number of Mines at work, days' labor performed, quantities of Quartz crushed, Yield of Gold, etc., for the year ended December 31st, 1883.

DISTRICTS.	Number of Mines.	Days' labor.	Mills Employed.	Steam Power.	Water Power.	Tons of Quartz, &c. Crushed.	Yield per Ton.			Maximum Yield per Ton.			Total Yield of Gold.			Average yield per man per day for 12 months at $18.00 per oz.
							Oz.	Dwt.	Gr.	Oz.	Dwt.	Gr.	Oz.	Dwt.	Gr.	
Carribou	2	2,816	3	2	1	2,094	0	4	14	1	1	18	477	11	6	3.05
Darr's Hill	2	18,120	2	1	1	7,602	0	10	5	0	17	8	3,885	19	19	3.85
Fifteen Mile Stream	1	1,570	2	1	1	83	0	11	6	0	17	10	46	17	14	.51
Montagu	2	1,673	3	3	....	76	0	19	12	1	11	0	74	4	5	.78
Oldham	2	2,913	2	1	1	1,253	0	15	22	3	0	0	999	17	8	6.18
Renfrew	1	3,211	1	....	1	3	0	17	10	0	17	10	0	17	10	.....
Sherbrooke	9	31,498	8	3	5	8,470	0	7	22	2	13	8	3,356	18	17	1.91
Stormont	1	7,520	1	1	....	551	3	9	9	3	18	0	1,917	3	0	4.58
Tangier	2	10,982	2	1	1	1,140	0	14	0	1	0	0	798	11	18	1.30
Uniacke	3	7,405	4	3	1	2,809	0	8	12	1	4	16	1,197	15	0	2.90
Waverley	1	793	2	1	1	96	0	8	12	1	12	12	46	3	0	1.04
Wine Harbor	....	.....	....	....	....	.....	..	..	..	..	..	..	....	..	..	.....
Unproclaimed, etc.	2	9,232	4	3	1	1,777	1	9	18	3	1	17	2,644	10	22	4.00
Total	28	97,733	34	20	14	25,954	0	10	21	3	18	0	15,446	9	23	2.84

MONTHLY STATEMENT FROM EACH GOLD DISTRICT

Month.	Carribou.							Darr's Hill.							Fifteen Mile Stream.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	405	16	330	80	5	0	2	1927	77	815	703	3	5	2	144	6	.....	..	..	..
February	3	512	20	338	52	17	19	2	1665	66	641	401	7	3	1	131	5	.....	..	..	..
March	2	315	12	224	63	5	0	2	1821	72	676	400	5	11	1	90	4	.....	..	..	..
April	2	132	4	513	83	7	19	2	1648	66	545	336	16	..	1	75	3	50	43	11	14
May	2	175	6	.....	..	..	..	2	1506	60	557	334	10	..	1	167	6	.....	..	..	..
June	3	200	8	10	2	5	0	2	1758	70	598	280	18	..	1	172	7	.....	..	..	..
July	3	236	9	.....	..	..	..	1	1360	54	675	290	..	..	1	278	10	.....	..	..	..
August	5	418	16	.....	..	..	..	1	1320	53	670	281	..	..	2	278	10	15	0	16	0
September	3	306	12	109	118	10	2	1	1295	51	600	271	0	..	...	.....	....	.....	..	..	..
October	1	23	1	165	14	10	12	1	1320	53	475	187	10	..	1	200	8	.....	..	..	..
November	1	78	3	218	37	6	2	1	1300	52	650	205	..	..	1	35	2	18	2	10	..
December	1	16	1	187	25	4	0	1	1200	48	600	194	10	..	...	.....	....	.....	..	..	..
	2	2,816	..	2094	477	11	6	1	18120	..	7602	3885	19	19	1	1570	....	83	46	17	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

Month.	Gay's River.							Montagu.							Oldham.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January								3	200	8	..	..	..	..	1	100	4	194	106	7	0
February								2	184	7	..	..	..	..	1	115	4	93	43	10	0
March								2	113	4	25	27	5	0	1	130	5	113	65	18	0
April								1	162	6	..	..	..	..	2	207	8	10	34	11	17
May								1	185	7	22	34	10	10	2	401	12	188	143	11	4
June								1	180	7	8	5	2	14	3	536	21	92	81	0	0
July								1	70	3	18	4	18	14	2	220	19	72	40	19	15
August								1	157	6	3	2	7	15	2	190	7	40	26	3	18
September								1	124	5	..	..	..	..	2	250	10	68	80	2	15
October								2	162	6	..	..	..	..	2	310	12	152	131	2	19
November								2	86	3	..	..	..	..	2	373	15	102	112	12	0
December								1	50	2	..	..	..	..	1	81	3	129	133	18	16
								2	1673		76	74	4	5	2	2913	....	1253	999	17	8

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	RENFREW.							SHERBROOKE.							STORMONT.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.
January	1	16	..	..	..	..	..	9	3240	130	948	448	15	0	1	675	27	24	95	0	0
February	..	..	..	..	..	..	..	9	3105	124	936	538	0	7	1	630	25	84	338	10	0
March	..	..	..	..	..	..	..	9	2970	118	878	387	13	0	1	720	29	12	2	8	0
April	1	123	5	3	0	17	10	10	2916	116	713	235	17	0	1	612	24	65	191	0	0
May	1	413	12	..	..	..	..	8	2835	113	948	310	2	0	1	590	23	57	223	4	0
June	1	386	15	..	..	..	..	8	2652	106	859	212	9	0	1	520	20	44	163	0	0
July	1	543	21	..	..	..	..	10	3016	120	727	232	12	10	1	575	23	39	111	10	0
August	1	492	19	..	..	..	..	10	2106	84	323	128	18	0	1	487	19	43	163	8	0
September	1	296	11	..	..	..	..	10	2028	81	485	207	10	0	2	702	28	35	111	0	0
October	1	330	12	..	..	..	..	10	1820	72	664	265	5	0	1	615	24	45	138	11	0
November	1	248	10	..	..	..	..	8	1976	79	357	157	11	0	1	700	28	50	189	19	0
December	1	364	14	..	..	..	..	10	2834	113	631	232	6	0	1	694	27	53	189	13	0
	1	3211	..	3	0	17	10	9	31498	....	8470	3356	18	17	1	7520	..	551	1917	3	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT—(CONTINUED.)

MONTH.	TANGIER.							UNIACKE.							WAVERLEY.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	897	36	275	95	18	0	3	552	22	126	28	15	15	1	90	3	10	8	11	0
February....	3	1,164	46	....	..	..	..	4	767	31	291	155	14	15	1	72	3	18	3	10	0
March	2	1,736	69	162	100	2	0	5	873	35	444	161	2	19	1	88	3	7	3	4	0
April	2	793	31	51	28	15	6	4	523	21	237	172	8	13	1	62	2	19	2	14	0
May.....	2	1,278	51	74	47	19	0	4	544	21	202	107	8	13	1	40	1	14	3	13	0
June	2	759	30	12	5	8	0	3	295	11	241	74	8	1	1	54	2	4	6	10	0
July	2	289	12	142	127	8	0	3	899	36	68	61	11	0	2	84	3	12	7	15	0
August	2	339	13	4	1	15	0	3	723	29	264	61	19	0	2	110	4	4	5	17	0
September...	2	531	21	131	119	11	12	4	652	26	213	78	13	6	...	.....	....	3	3	14	0
October	2	646	26	154	135	5	0	4	524	51	237	92	19	0	1	23	1	5	..	15	0
November...	2	1,164	46	....	..	..	..	3	478	19	159	78	17	19	1	78	3	....	..	..	..
December ...	2	1,386	55	135	136	..	0	4	575	23	327	122	16	19	1	272	10	....	..	..	..
	2	10,982	....	1,140	798	1	18	3	7,405	....	2,809	1,197	15	0	1	973	....	96	46	3	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT—(CONTINUED).

MONTH.	UNPROCLAIMED.							WINE HARBOUR.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	4	556	22	....	..	..	..							
February	4	358	15	....	..	..	..							
March	5	252	2	129	35	12	12							
April	....	....	....	....	..	..	..							
May	....	....	....	....	..	..	..							
June	....	....	....	....	..	..	..							
July	1	100	4	4	3	2	0							
August	1	100	4	51	2	5	13							
September	1	52	1	....	..	..	..							
October	2	215	8	1	..	3	18							
November	1	162	6	42	88	0	16							
December	2	503	20	7	21	0	10							
	1	2,198	....	302	150	4	21							

GOLD.

GENERAL ANNUAL SUMMARY.

Year.	Total ounces of Gold Extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, $18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7,275			6,473	1	2	11	156,000	$ 83	$249
1863	14,001	14	17	17,002		16	11	273,264	92	276
1864	20,022	18	13	21,434		18	16	252,720	1 42	426
1865	25,454	4	8	24,423	1	0	20	212,966	2 15	645
1866	25,204	13	2	32,161		15	2	211,796	2 14	642
1867	27,314	11	11	31,386		17	9	218,894	2 24	672
1868	20,541	6	10	32,262		12	17	241,462	1 53	459
1869	17,868	0	19	35,147		10	4	210,928	1 52	456
1870	19,866	5	5	30,829		12	21	173,680	2 05	615
1871	19,227	7	4	30,791		12	11	162,992	2 12	636
1872	13,094	17	6	17,093		15	7	112,476	2 09	627
1873	11,852	7	19	17,708		13	9	93,570	2 28	684
1874	9,140	13	9	13,844		13	5	77,246	2 12	636
1875	11,208	14	19	14,810		15	4	91,698	2 20	660
1876	12,038	13	18	15,490		15	13	111,304	1 94	582
1877	16,882	6	1	17,369		19	10	123,565	2 46	738
1878	12,577	1	22	17,990		13	23	110,422	2 05	615
1879	13,801	8	10	15,936		17	8	92,002	2 34	702
1880	13,234	0	4	14,037		18	20	103,826	2 18	54
1881	10,756	13	2	15,556		12	20	126,308	1 52	456
1882	14,107	3	20	22,081		12	18	106,884	2 37	711
1883	15,446	9	23	25,954		10	21	97,733	2 84	926
Total	350,916	13	2	470,776	.....			3,362,106	.....	.....

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

Gypsum Exports—Ton of 2,000 lbs.

Windsor	Tons.	102,715	Value	$102,184
Cheverie	"	31,558	"	21,461
Walton	"	6,695	"	5,023
Hantsport	"	3,700	"	3,386
		144,668		$132,052

Building Stones.

Pictou	Tons.	105	Value	$ 800
Antigonish	"	76	"	532
*Wallace	"	..	"	...

Grindstones, Etc.

Parrsborough	Tons.	155	Value	$ 1,085
*Lower Cove	"	...	"	.....

Manganese.†

Tenny Cape	Tons.	125	Value	$
Walton	"	5	"	12,462
Cheverie	"	4	"	
Loch Lomond	"	16	"	.....
		150		$ 12,462

Average number persons employed mining 20

Limestone, Etc.

St. Peters	Tons.	3,672	Value	$ 3,672
Pugwash	"	133	"	133
Londonderry, ankerite	"	7,672	"	
Brookfield	"	15,000	"	
	Tons,	26,477		$ 3,805

*No returns.

† These mines do not work continuously.

IRON MINING.

Londonderry ....52,410 tons.

AVERAGE FORCE EMPLOYED DAILY.

Belowground	Miners	81	Number of days labor ..	21,898
"	Laborers	29	" " ..	7,179
Aboveground	Mechanics, etc.	17	" " ..	4,774
"	Laborers.....	97	" " ..	24,285
	Total.....	224	"	58,136

COPPER MINING.

Coxheath ....60 tons (concentrated)

AVERAGE FORCE EMPLOYED DAILY FOR SIX MONTHS.

Belowground	45	Number of days labor...	12,058
Aboveground	46		

I give here the following extracts referring to Nova Scotia from the Dominion census of 1881, which will show the extent of certain operations, returns of which do not appear fully in my reports.

Limestone, number of	Kilns,	108	Value of production..	$49,738
Gypsum "	Mills,	4	" " ..	1,200
Brickworks "	Works,	41	" " ..	64,775
Grindstones "	"	3	" " ..	50,737
Manganese "	Tons	316	.....	
Phosphate of Lime	"	165	....	
Building Stone for dressing.	Cub. ft.	214,819	.....	

INTERCOLONIAL RAILWAY.

STATEMENT shewing the number of tons of Coal received at the following stations from Mines in Nova Scotia for year ending 31st December, 1883:

STATIONS.	No. Tons.	STATIONS.	No. Tons.
Halifax	50,566	*Brought forward*	.....
Bedford	434	Shediac	243
Windsor Junction	5,382	Point du Chene	73
Wellington	92	Moncton	13,144
Enfield	480	Salisbury	1,356
Elmsdale	124	Petitcodiac	146
Milford	54	Penobsquis	1,668
Shubenacadie	390	Sussex	491
Stewiacke	262	Apohaqui	28
Brookfield	105	Norton	28
Truro	6,938	Passekeag	18
Valley	36	Hampton	717
Riversdale	10	Rothesay	212
West River	34	Cold Brook	1,200
Glengarry	6	Saint John	21,897
Hopewell	1,182	Berry's Mills	22
Stellarton	24	Weldford	42
New Glasgow	15,357	Chatham Junction	93
P. Landing	87,708	Chatham	477
Belmont	10	Kent Junction	299
DeBert	33	Newcastle	408
Londonderry	66,464	Bathurst	72
East Mines	28	Jacquet River	8
Wentworth	81	New Mills	24
Greenville	30	Charlo	12
Thompson	70	Dalhousie	12
Oxford	477	Campbellton	126
River Philip	29	Little Metis	12
Athol	18	St. Flavie	18
Maccan	51	St. Luce	4
Nappan	85	Rimouski	343
Amherst	3,440	Trois Pistoles	16
Aulac	228	River du Loup	61
Sackville	1,606	St. Paschal	12
Dorchester	20,749	St. Anne	4
Memramcook	338	S. Henri	101
Painsec	13	Chaudiere	54,790
Carried forward		Total	361,111

INTERCOLONIAL RAILWAY.

STATEMENT, *shewing the quantities, in tons, of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway, during the year 1883.*

MONTHS.	ACADIA.	ALBION.			DRUMMOND.	VALE.	SPRING HILL.		CHIGNECTO.
		Round	Small.	Coke.			Round.	Small.	
January	.....	1801	38	.....	17	2365	9384	120	.....
February	21	1898	25	.....	13	1415	9467	.....	.....
March	10	2211	16	11	52	6	10069	.....	.....
April	.....	2812	21	.....	.....	27	10987	.....	.....
May	.....	2651	.....	.....	15	.....	9609	.....	.....
June	.....	983	.....	.....	.....	.....	7527	.....	1288
July	.....	1477	113	.....	.....	.....	2914	.....	.....
August	.....	930	25	.....	.....	10	8506	.....	2330
September	14	1547	34	21	.....	.....	5312	12	1984
October	.....	3275	58	.....	34	30	6256	.....	735
November	.....	2474	74	13	.....	.....	7426	.....	1685
December	.....	1323	68	.....	.....	.....	7456	.....	1991
	45	23382	472	45	131	3853	94913	132	10013

MONCTON, N. B., 3rd March, 1884.

From the following Stations:

STATIONS.	No. Tons.
Drummond	57,397
Hopewell	15,988
Stellarton	143,283
New Glasgow	60,653
Maccan	7,733
Spring Hill	76,037
Albion	20
Total	361,111

Moncton, N. B., 3rd March, 1884.

FINANCIAL STATEMENT.—GOLD, &c.

Mines Department, for Twelve Months ended December 31st, 1883.

DISTRICT.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Totals.	Return Rents.	Return Royalty.	Royalty Commiss'n.	Salaries and Surveys.	Totals.
Caribou	.....	213 13	$ 213 13	$.....	$.....	$ 8 26	$ 11 00	$ 19 26
Darr's Hill	$ 280 00	571 50	851 50	.....	.....	.....	.....	.....
Fifteen Mile Stream	144 00	50	144 50	.....	.....	.....	.....	.....
Gay's River	.....	1 86	1 86	.....	.....	.....	.....	.....
Lawrencetown	.....	36	36	.....	.....	.....	.....	.....
Montagu	4 00	21 34	25 34	.....	.....	.....	.....	.....
Oldham	6 00	311 70	317 70	.....	.....	11 01	48 00	59 01
Ovens	52 00	.....	52 00	.....	.....	.....	.....	.....
Renfrew	10 00	23 35	33 35	.....	.....	1 15	42 00	43 15
Sherbrooke	86 00	1258 21	1344 21	12 00	.....	63 71	402 80	478 51
Stormont	134 00	585 89	719 89	.....	.....	36 24	38 00	74 24
Tangier	113 00	209 76	322 76	30 00	.....	35	.....	30 35
Uniacke	70 00	223 27	293 27	.....	.....	15 96	130 00	145 96
Waverley	204 00	18 23	282 23	180 00	2 79	42	.....	183 21
Wine Harbor	72 00	.....	72 00	.....	.....	.....	7 50	7 50
Unproclaimed	1128 00	3050 85	4178 85	.....	.....	.....	466 30	466 30
Prospecting Licenses	.....	.....	3782 22	.....	.....	.....	.....	* 178 00
	$ 2363 00	$6489 95	$12635 17	$222 00	2 79	$ 187 10	$1145 60	$ 1685 49

* Return.

OTHER THAN GOLD.

Mines Department, for Twelve Months ended Dec. 31st, 1883.

COUNTIES.	RECEIPTS.				EXPENDITURE.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Return Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	$ 20 00	$ 150 00	$.....	$ 170 00	$.....	$.....	$.....
Antigonish	160 00	50 00	.....	210 00	.....	.....	.....
Cape Breton	540 00	325 00	53587 08	54452 08	60 00	380 76	440 76
Colchester	460 00	300 00	.....	760 00	.....	.....	.....
Cumberland	500 00	200 00	12174 78	12874 78	20 00	585 00	605 00
Digby	20 00	.....	.....	20 00	.....	.....	.....
Guysborough	80 00	.....	.....	80 00	.....	.....	.....
Hants	100 00	.....	.....	100 00	.....	.....	.....
Inverness	180 00	50 00	.....	230 00	20 000	.....	20 00
Kings	80 00	.....	.....	80 00	.....	.....	.....
Lunenburg	160 00	.....	.....	160 00	.....	.....	.....
Pictou	620 00	.....	39191 61	39811 61	.....	.....	.....
Richmond	120 00	25 00	.....	145 00	20 00	.....	20 00
Victoria	60 00	50 00	.....	110 00	.....	.....	.....
Yarmouth	80 00	.....	.....	80 00	.....	.....	.....
Examinations	.....	.....	.....	52 00	.....	.....	409 72
	$ 3180 00	$ 1150 00	$104953 47	$ 109335 47	$ 120 00	$ 965 76	$ 1495 48

ABSTRACT ACCOUNT.

Receipts and Expenditure for the Twelve Months ended 31st December, 1883.

RECEIPTS.			EXPENDITURE.		
Licenses to Search	$ 3180 00		Return Licenses to Search	$ 120 00	
" " Work	1150 00		Salaries and Surveys	965 76	
Royalty	104953 47		Examinations	409 72	
Examinations	52 00				$ 1495 48
		$ 109335 47	Return Rents	$ 222 00	
Rents	$ 2363 00		" Royalty	2 79	
Royalty	6489 95		Royalty Commission	137 10	
Prospecting Licenses	3782 22		Salaries and Surveys	1145 60	
		$ 12635 17	Return Prospecting Licenses	178 00	
					$ 1685 49
			General Expenses	$ 5865 72	
			Postage	82 98	
			Stationery and Printing	125 12	
					$ 6073 82
		$ 121970 64			$9254 79